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THE INCIDENCE AND CAUSES OF BLINDNESS IN ENGLAND AND WALES 1948—1962

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ARNOLD SORSBY

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PREFACE

Three reports on the causes of blindness, prepared by Professor Arnold Sorsby, have been published in the last fifteen years: one by the Medical Research Council and two by the Ministry of Health. Interim analyses of certificates of blindness and of partial sight have been published since 1952 in the Annual Report of the Chief Medical Officer. In the report which follows Professor Sorsby has consolidated the studies from the period 1948 to 1962. As the years have passed, the information obtainable from these certificates has become progressively more complete, and since 1955 they have been provided by consultants in ophthalmology. Of course the registers do not include every person who is blind or partially sighted, but there is good reason to believe that the number not so recorded has been declining in recent years. It is therefore a welcome finding in this present report that the numbers on the blind register are not now rising in proportion to the numbers of old people in the population, and in Section 3 of this report Professor Sorsby attributes this to the action taken through the National Health Service to provide, and to provide earlier, treatment for cataract. Indeed, in this Section, Professor Sorsby discusses one of the few examples in our health statistics of objective evidence in support of our belief that the National Health Service is progressively improving the health of the population.

It seems that we need no longer fear the great increase in the blind population that had been forecast earlier, but nonetheless this report, like its predecessors, points to the need for continued effort both to reduce the incidence of blindness and to secure earlier treatment for those conditions which can be treated. In particular it underlines our ignorance of the aetiology of most blindness.

Professor Sorsby has made a contribution of great value to ophthalmology and our social services in the work he has undertaken in analysis of these certificates. I gladly pay a special tribute to him for the assistance he has given to the Ministry of Health over a period now approaching twenty years.

G. E. Godber,

Chief Medical Officer.

ACKNOWLEDGEMENTS

For the blind certificates on which the report for 1955–62 is based I am obliged to the Medical Officers of Health throughout the country, to Miss M. Henham-Barrow, Mrs. M. J. Warriner and Mrs. F. E. Spencer of the Southern, the Northern and the Western Regional Associations for the Blind, and to Dr. A. N. Culley of the Welsh Board of Health. Mr. M. S. Colborne Brown of the Royal National Institute for the Blind and Mr. M. Vanson of the Jewish Blind Society have helped with data on the Sunshine Homes and the Jewish blind. The Staff of the General Register Office have greatly facilitated the statistical work.

The continued interest of Capt. J. A. D. Cochrane-Barnett is gratefully acknowledged, as is the unstinted help I have had from Miss E. M. Gower.

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Full reviews of the trends in the number of blind and in the causes of blindness during the three years 1948-50 and during the subsequent four years, 1951-54, have been given in two earlier monographs (Sorsby, 1953 and 1956). The first section of the present study records the findings for 1955 to 1962; this elaborates the brief accounts given in the relevant Annual Reports of the Chief Medical Officer of the Ministry of Health for 1955-61.

The two earlier monographs (which covered a total of 53,052 blind certificates) were based on data recorded on the old form of certification, analysed by the clinical entities shown on that form. This classification is given in the master tables of those monographs and more fully elsewhere (Sorsby, 1950). The data on the clinical findings since 1955 have been recorded by a double entry which shows both the site of the lesion and its aetiology—a classification first recommended by the [American] National Society for the Prevention of Blindness and adopted in its essential features in 1951 by the International Association for the Prevention of Blindness. The actual classification—slightly modified in use—with the code numbers used in transcribing the clinical data on to record cards is shown in Table C in the Appendix.

The data derived from the classification employed for the certificates in 1948-54 generally lent themselves to comparison with those derived from the more recent classification, though there were difficulties with several entries, such as optic atrophy and congenital defects in which the older classification failed to distinguish adequately between topography and aetiology.

But the major affections, such as 'senile' cataract, 'senile' macular lesions, glaucoma, myopic chorioretinal atrophy, presented no such difficulties. Extensive data are therefore available for a consecutive period of fifteen years and this unique material of 118,277 certificates analysed out of a total of 165,606 issued between April 1st, 1948 and December 31st, 1962 is used for an overall survey in the second section of this report and in the Discussion on both these sections.

SECTION I

BLINDNESS IN ENGLAND AND WALES 1955-62

1. THE BLIND POPULATION: NUMBERS, AGE AND SEX DISTRIBUTION

The number of blind

As can be seen from Table 1, there were a total of 91,407 new registrations as blind during 1955 to 1962, distributed fairly evenly at around 11,000 in each of the eight years. The register of the blind, which stood at 93,622 at the end of 1954, has, however, increased but slightly during this period: the number rose to 94,683 in 1955 and has remained relatively stationary at around 96-97,000 in the subsequent years (Table 2).

Since few names are removed from the Blind Register for causes other than death, it is clear that the number of blind who die each year is approximately the same as the number of new registrations—a finding readily explained by the age distribution of the blind population.

Age and sex distribution

At 31st December, 1962, the Blind Register stood at 96,729, of whom 55,806 were aged over 70, whilst the age group 60-69 accounted for another 16,276 of the total; only 25·5 per cent were aged under 60. This concentration at the higher age groups reflects a similar trend in new registrations and contrasts sharply to the age distribution of the general population: at the 1961 Census the age group of 70 and over contained 7·7 per cent, and the age group 60-69 gave 9·7 per cent of the population; the respective percentages of the newly registered blind in these age groups in 1955-62 were 71·0 and 15·1 (Table 3).

There was a marked sex difference in the number of registered blind. In 1955 there were 53,985 females against 40,698 males, and the disproportion was very much the same in each of the succeeding years. Likewise, as can be seen from Table 1, there were more females amongst the newly registered each year: 7,181 against 4,466 males in 1955, with a similar disproportion for subsequent years.

Whilst the annual number of new registrations fluctuated little over the eight years, there were some variations at the different age groups. As can be seen from Table 1, there was a fairly definite decline in the numbers registered in the age groups under 60 years and a less definite decline at 60-69 years, set off by some increase in the highest age groups. Computed rates per 100,000 are shown in Table 4 for each year by sex in the different age groups. In males, there was a distinct decline over the 8 years in the age groups 0-1 and 1-4 years, with a less definite downward trend at 50-59 years. In females, the decline is most marked at the age groups 50 to 69 years with a less definite downward trend at 0-1 year. At the age groups over 70 no clear trend emerges for either sex. There is, however, the suggestion of an increase for males at these ages, and possibly also for females over 85.

TABLE 1

New Registrations in England and Wales 1955–62: by age and sex

Age group (years)	0–1	1–4	5–15	16–20	21–29*	30–39*	40–49	50–59	60–64	65–69	70–79	80–84	85–89	90 and over	Not known	Total
Registered during the year ending 31st December, 1955.																
Males	23	82	71	26	74	115	179	329	249	405		2,908			5	4,466
Females	11	57	47	13	45	61	169	427	421	695		5,230			5	7,181
Persons	34	139	118	39	119	176	348	756	670	1,100		8,138			10	11,647
Registered during the year ending 31st December, 1956.																
Males	23	80	67	33	66	105	190	348	280	418		2,989			1	4,600
Females	11	46	45	20	46	73	174	400	421	754		5,470			2	7,462
Persons	34	126	112	53	112	178	364	748	701	1,172		8,459			3	12,062
Registered during the year ending 31st December, 1957																
Males	16	60	61	21	47	122	152	344	272	421	1,339	847	451	127	6	4,286
Females	9	44	40	27	28	69	139	400	355	659	2,509	1,509	871	336	7	7,002
Persons	25	104	101	48	75	191	291	744	627	1,080	3,848	2,356	1,322	463	13	11,288
Registered during the year ending 31st December, 1958																
Males	21	42	85	30	39	113	174	316	278	359	1,300	765	408	78	7	4,015
Females	14	45	45	10	27	64	138	373	398	666	2,358	1,436	869	327	13	6,783
Persons	35	87	130	40	66	177	312	689	676	1,025	3,658	2,201	1,277	405	20	10,798
Registered during the year ending 31st December, 1959																
Males	22	56	53	42	62	121	188	329	314	418	1,409	849	425	106	4	4,398
Females	9	42	47	17	24	79	122	375	401	596	2,558	1,537	996	381	12	7,196
Persons	31	98	100	59	86	200	310	704	715	1,014	3,967	2,386	1,421	487	16	11,594
Registered during the year ending 31st December, 1960.																
Males	13	61	63	28	50	110	156	331	249	431	1,394	840	465	139	8	4,338
Females	11	39	28	19	40	62	118	445	387	699	2,496	1,617	1,011	366	5	7,343
Persons	24	100	91	47	90	172	274	776	636	1,130	3,890	2,457	1,476	505	13	11,681
Registered during the year ending 31st December, 1961.																
Males	16	51	51	31	47	92	161	294	216	415	1,207	775	432	121	2	3,911
Females	6	47	33	14	32	65	135	371	356	604	2,294	1,519	1,061	371	5	6,913
Persons	22	98	84	45	79	157	296	665	572	1,019	3,501	2,294	1,493	492	7	10,824
Registered during the year ending 31st December, 1962.																
Males	12	50	52	32	52	107	156	301	265	435	1,450	821	464	123	1	4,321
Females	10	49	47	20	29	63	147	350	370	600	2,457	1,583	1,071	386	10	7,192
Persons	22	99	99	52	81	170	303	651	635	1,035	3,907	2,404	1,535	509	11	11,513

*For 1955 and 1956 these age groups were 21–30 and 31–39 years.

TABLE 2

Registered Blind Population in England and Wales 1955–62: by age and sex

Age group (years)	0–1	1–4	5–15	16–20	21–29*	30–39*	40–49	50–59	60–64	65–69	70–79	80–84	85–89	90 and over	Not known	Total
Blind population at 31st December, 1955.																
Males	10	307	955	502	1,493	2,337	3,811	5,451	3,514	4,119		18,192			7	40,698
Females	3	252	725	363	1,028	1,629	3,022	5,196	4,028	5,446		32,279			14	53,985
Persons	13	559	1,680	865	2,521	3,966	6,833	10,647	7,542	9,565		50,471			21	94,683
Blind population at 31st December, 1956																
Males	13	274	1,021	510	1,467	2,227	3,802	5,385	3,605	4,076		18,417			6	40,803
Females	6	197	790	367	1,009	1,592	2,963	5,110	4,127	5,385		33,661			9	55,216
Persons	19	471	1,811	877	2,476	3,819	6,765	10,495	7,732	9,461		52,078			15	96,019
Blind population at 31st December, 1957																
Males	5	252	1,060	491	1,249	2,399	3,713	5,325	3,503	4,086	10,002	4,888	2,759	887	14	40,633
Females	1	163	818	353	867	1,701	2,869	5,095	4,081	5,350	16,527	9,213	6,088	2,990	17	56,133
Persons	6	415	1,878	844	2,116	4,100	6,582	10,420	7,584	9,436	26,529	14,101	8,847	3,877	31	96,766
Blind population at 31st December, 1958																
Males	8	208	1,108	499	1,165	2,431	3,603	5,259	3,451	4,040	9,781	4,845	2,810	888	18	40,114
Females	6	146	829	340	832	1,684	2,800	5,023	4,002	5,398	16,432	9,442	6,292	3,111	24	56,361
Persons	14	354	1,937	839	1,997	4,115	6,403	10,282	7,453	9,438	26,213	14,287	9,102	3,999	42	96,475
Blind population at 31st December, 1959																
Males	9	202	1,098	513	1,183	2,325	3,630	5,205	3,539	3,981	9,638	4,872	2,869	990	9	40,063
Females	—	128	856	353	789	1,663	2,744	4,949	3,938	5,355	16,625	9,485	6,729	3,251	21	56,886
Persons	9	330	1,954	866	1,972	3,988	6,374	10,154	7,477	9,336	26,263	14,357	9,598	4.241	30	96,949
Blind population at 31st December, 1960.																
Males	4	191	1,102	533	1,160	2,217	3,628	5,166	3,525	3,932	9,577	4,832	3,012	1,076	10	39,965
Females	6	121	848	351	807	1,531	2,717	4,928	3,893	5,379	16,502	9,827	7,066	3,508	20	57,504
Persons	10	312	1,950	884	1,967	3,748	6,345	10,094	7,418	9,311	26,079	14,659	10,078	4,584	30	97,469
Blind population at 31st December, 1961																
Males	5	174	1,099	509	1,121	2,150	3,572	5,159	3,281	4,065	9,220	4,678	3,098	1,089	8	39,228
Females	2	120	846	347	793	1,480	2,680	4,822	3,794	5,342	16,267	9,893	7,269	3,698	10	57,363
Persons	7	294	1,945	856	1,914	3,630	6,252	9,981	7,075	9,407	25,487	14,571	10,367	4,787	18	96,591
Blind population at 31st December, 1962																
Males	6	168	1,091	511	1,108	2,085	3,499	5,166	3,251	3,981	9,257	4,790	3,045	1,159	6	39,123
Females	1	122	865	344	796	1,419	2,644	4,784	3,734	5,310	16,240	9,994	7,449	3,872	32	57,606
Persons	7	290	1,956	855	1,904	3,504	6,143	9,950	6,985	9,291	25,497	14,784	10,494	5,031	38	96,729

*For 1955 and 1956 these age groups were 21–30 and 31–39 years.

TABLE 3

New registrations: 1955-62

Age distribution compared with that of the enumerated population at the 1961 census

Age group	New Registrations						Census 1961		
	Male		Female		Persons		Male	Female	Persons
	No.	%	No.	%	No.	%	%	%	%
0–1	146	0·4	81	0·1	227	0·3	8·3	7·3	7·8
1–4	482	1·4	369	0·7	851	0·9			
5–15	503	1·5	332	0·6	835	0·9	17·5	15·6	16·6
16–20	243	0·7	140	0·2	383	0·4	7·0	6·5	6·7
21–29*	437	1·3	271	0·5	708	0·8	11·7	10·8	11·2
30–39*	885	2·6	536	0·9	1,421	1·6	14·0	13·1	13·5
40–49	1,356	3·9	1,142	2·0	2,498	2·7	13·8	13·4	13·6
50–59	2,592	7·6	3,141	5·5	5,733	6·3	13·4	13·3	13·4
60–64	2,123	6·2	3,109	5·4	5,232	5·7	4·9	5·7	5·3
65–69	3,302	9·6	5,273	9·3	8,575	9·4	3·7	4·9	4·3
70 and over	22,232	64·8	42,619	74·8	64,851	71·0	5·7	9·4	7·6
	34,301	100·0	57,013	100·0	91,314	100·0	100·0	100·0	100·0
Not known	34		59		93				
	34,335		57,072		91,407				

*For 1955 and 1956 the returns were for the age groups 21–30 and 31–39 years.

TABLE 4

New Registrations: 1955–62
Rates per 100,000 of the Home population*
in some age groups

Age group:	0–1	1–4	5–15	16–20	21–29	30–39	40–49	50–59	60–64	65–69	70–79	80–84	85 and over	All ages
						MALES								
1955	6·9	6·1	1·9	2·0	2·5†	3·9†	5·5	12·4	25·8	51·6	←———	233·0	———→	20·9
1956	6·6	6·0	1·8	2·5	2·3†	3·6†	5·9	12·8	28·7	52·9	←———	238·2	———→	21·4
1957	4·5	4·4	1·6	1·5	1·8	3·9	4·8	12·3	27·5	52·8	135·3	429·9	672·1	19·8
1958	5·7	3·1	2·2	2·2	1·5	3·6	5·6	11·1	27·7	44·9	131·6	390·3	552·3	18·4
1959	5·8	4·0	1·4	3·0	2·4	3·8	6·3	11·3	30·5	51·9	142·6	431·0	590·0	20·1
1960	3·4	4·2	1·6	1·9	1·9	3·5	5·1	11·2	23·4	53·0	140·1	417·9	642·6	19·7
1961	4·0	3·5	1·3	2·0	1·8	3·0	5·2	9·9	19·5	50·6	121·9	378·0	601·1	17·5
1962	2·9	3·3	1·3	1·9	2·0	3·5	5·0	10·1	23·1	52·5	146·0	402·5	624·5	19·1
						FEMALES								
1955	3·5	4·4	1·3	0·9	1·6	2·0	5·0	14·3	33·6	64·2	←———	262·4	———→	31·2
1956	3·3	3·6	1·2	1·4	1·6	2·5	5·2	13·2	33·2	69·0	←———	268·8	———→	32·2
1957	2·7	3·4	1·1	1·9	1·1	2·2	4·2	13·1	27·6	59·5	162·1	422·7	656·0	30·1
1958	4·0	3·5	1·2	0·7	1·1	2·0	4·3	12·0	30·5	59·6	150·7	390·2	636·2	29·0
1959	2·5	3·2	1·3	1·2	0·9	2·4	3·9	12·0	30·3	52·6	161·6	404·5	713·5	30·6
1960	3·1	2·9	0·8	1·3	1·6	2·0	3·8	14·1	28·8	60·8	155·1	410·4	678·3	31·0
1961	1·6	3·4	0·9	0·9	1·2	2·1	4·2	11·7	26·3	52·0	141·3	377·9	659·9	29·0
1962	2·5	3·4	1·3	1·2	1·1	2·1	4·6	11·0	26·9	51·0	149·5	388·9	647·6	28·7

*Home population as at midyear in this table as in all others where rates per 100,000 are given.
† In 1955 and 1956 the age groups recorded were 21–30 and 31–39 years. The rates shown have been adjusted to allow for this.

There were striking differences in the rates per 100,000 related to sex. For females at all ages the rate was of the order of about 30 and varied but little over the eight years. For males the annual rates, though rather more variable over the eight years, were about a third lower: about 20 per 100,000. The markedly higher rate for females at all ages hides a consistently lower rate in the age groups up to 50 when a reversal sets in: at the higher ages the rates for women are almost consistently higher than for men.

The higher number of males registered under 50 and the higher rates per 100,000 at these ages imply that there is either a true sex difference in the incidence of blindness at these ages, or that for social or other reasons females in these age groups are less ready to seek registration. The reversal in numbers registered after the age of 50 (when a female excess becomes established) is largely due to the greater number of females in the general population. Actual rates per 100,000 are however higher for women over 50. Whether this represents belated registrations and other social considerations, or an actually higher incidence of blindness cannot be determined on the available data.

2. ANALYSIS OF BLIND CERTIFICATES

For the years 1955 to 1960 there were 69,070 new registrations; of this total, 62,128 certificates (89·9 per cent) were available for analysis. For 1961 and 1962 the available certificates of those aged up to 60 and 65 years respectively were studied, the numbers being 1,268 and 1,829. In all there were therefore 65,225 certificates for study (Tables 5a and b).

TABLE 5

Age at registration shown in certificates of blindness

(*a*) 1955-60*: All ages*

Age group (in years)	Males		Females		Persons	
	No.	Per cent	No.	Per cent	No.	Per cent
0–1	100	0·4	59	0·1	159	0·3
1–4	346	1·5	255	0·7	601	1·0
5–14	294	1·3	192	0·5	486	0·8
15–19	175	0·8	106	0·3	281	0·4
20–29	315	1·4	193	0·5	508	0·8
30–39	638	2·7	381	1·0	1,019	1·7
40–49	941	4·0	733	1·9	1,674	2·7
50–59	1,720	7·4	2,086	5·4	3,806	6·2
60–69	3,499	15·0	5,559	14·5	9,058	14·7
70–79	7,543	32·4	13,161	34·3	20,704	33·6
80–89	7,015	30·2	13,443	35·1	20,458	33·2
90 and over	679	2·9	2,175	5·7	2,854	4·6
	23,265	100·0	38,343	100·0	61,608	100·0
Not stated	205		315		520	
	23,470		38,658		62,128	

TABLE 5

(*b*) 1961–62: *limited age groups*

Age group	1961						1962					
	Males		Females		Persons		Males		Females		Persons	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
0–1	13	2·0	5	0·8	18	1·4	5	0·7	6	1·0	11	0·8
1–4	43	6·6	42	6·8	85	6·7	43	6·3	35	5·6	78	6·0
5–14	36	5·5	30	4·9	66	5·2	48	7·1	40	6·3	88	6·7
15–19	26	4·0	8	1·3	34	2·7	37	5·4	20	3·2	57	4·4
20–29	47	7·2	30	4·9	77	6·1	52	7·7	29	4·6	81	6·2
30–39	86	13·2	56	9·1	142	11·2	99	14·6	62	9·8	161	12·3
40–49	141	21·6	118	19·2	259	20·4	130	19·2	129	20·5	259	19·8
50–59	261	39·9	326	53·0	587	46·3	265	39·0	308	49·0	573	43·8
	653	100·0	615	100·0	1,268	100·0	679	100·0	629	100·0	1,308	100·0
60–64							228		293		521	
							907		922		1,829	

The 89·9 per cent of certificates of new registrations in 1955-60 submitted to analysis were in no way selected, and the age distribution given in the certificates (Table 5) agrees closely with that shown by the registrations as blind (Table 3). Equally, the material for 1961 and 1962 is representative of the age groups to which it refers. The material as a whole is therefore adequate for analysis of the causes of the blindness.

The degree of blindness

Table 6 shows that total blindness (no perception of light) is exceptional amongst those registered as blind (3·4 per cent); almost total blindness (perception of light only) is more frequent (10.4 per cent), but well over half of those registered (58·8 per cent) have some degree of useful vision (hand movements and vision of up to 3/60 Snellen), whilst 27·4 per cent have vision of more than 3/60. The number who have better vision than 3/60 is double the combined number of those having no perception of light and perception of light only. Taken as a whole, the blind population is thus largely one afflicted with grossly defective vision rather than with blindness in the full sense of the term.

TABLE 6

Degree of blindness by age groups and sex: percentage distribution

1955–60

Age groups: (years)	0–1		1–4		5–14		15–19		20–29		30–39		40–49		50–59		60–69		70–79		80–89		90 and over		All ages*		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	P.
Number on which information is available	89	50	289	220	284	179	169	104	311	191	629	377	927	727	1,702	2,062	3,464	5,513	7,474	13,049	6,967	13,309	665	2,149	23,173	38,242	61,415
Percentages.																											
No perception of light	38·2	32·0	28·4	18·6	10·6	12·9	3·5	12·5	4·8	9·4	5·4	6·4	4·1	5·5	3·8	3·7	3·0	3·4	3·1	3·2	2·5	2·3	1·8	2·4	3·6	3·2	3·4
Perception of light	58·4	60·0	47·8	54·1	21·1	18·4	8·9	11·5	11·9	13·1	11·3	11·9	10·0	11·4	11·7	10·8	10·6	11·0	10·1	8·8	9·8	9·5	9·5	11·4	11·0	10·1	10·4
Hand movements up to 3/60 Snellen	3·4	8·0	19·0	23·2	43·0	48·6	45·6	40·4	46·9	46·6	51·2	54·1	50·1	53·9	51·8	57·1	54·3	57·2	57·8	59·0	62·7	62·9	67·2	69·1	56·9	60·0	58·8
Better than 3/60 Snellen	—	—	4·8	4·1	25·3	20·1	42·0	35·6	36·4	30·9	32·1	27·6	35·8	29·2	32·7	28·4	32·1	28·4	29·0	29·0	25·0	25·3	21·5	17·1	28·5	26·7	27·4
	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

*Including 203 males and 312 females of age not known.

Children and young adults show some specific features: a third of the infants under the age of 5 are recorded as totally blind. Admitting the difficulty of accurate assessment in infancy, it is significant that a high incidence of total blindness—some 12 per cent—is also seen in blind children of school age. Beyond these age groups there is a progressive decline in the proportion of the totally blind.

There is no substantial sex difference in the degree of blindness at the different age groups except for the considerable female excess at the heavier degrees of blindness (No P.L. and P.L. only) at 15-29 years—a finding that fits in well with the observation that at these ages registration in women is distinctly less frequent than in men. Presumably only the more severely affected young women seek registration.

BLINDNESS FROM THE SAME CAUSE IN BOTH EYES

Causes of blindness

The material as a whole

Of the total of 62,128 certificates for 1955-60 analysed, 58,272 or 93.8 per cent, showed blindness from the same cause in both eyes. An analysis of these 58,272 certificates is shown in Master Tables A and B in the Appendix. Table A gives a classification by aetiology, whilst Table B covers topographical and clinical entities.

From Table 7, based on Tables A and B, it will be seen that for all ages during

TABLE 7

Blindness from the same cause in both eyes 1955–60: all ages.

Classification by site and by aetiology

	Number	Percentage
Diagnosis by site of affection:		
Eyeball in general	9,013	15·5
Conjunctiva	88	0·1
Cornea	1,360	2·3
Lens	13,919	23·9
Uveal tract	6,650	11·4
Retina	23,929	41·0
Optic nerve, optic pathway, and cortical visual centres	2,809	4·9
Vitreous	58	0·1
Multiple and ill-defined defects	15	0·0
Globe normal	431	0·8
	58,272	100·0

TABLE 7—*cont.*

Diagnosis by aetiology:		
Infectious diseases (excluding transmitted maternal infection)	297	0·5
Trauma	253	0·4
Poisonings	198	0·3
Tumours	506	0·9
Systemic diseases not elsewhere classified ...	7,385	12·7
Pre-natal influences	3,122	5·4
Aetiology undetermined	46,511	79·8
	58,272	100·0

1955-60 affections of the retina accounted for 41·0 per cent of cases, the lens followed with 23·9 per cent, anomalies of the globe as a whole with 15·5 per cent and lesions of the uveal tract with 11·4 per cent. The globe was normal in 0·8 per cent, the blindness being of central origin, generally vascular in type. The remaining 7·4 per cent were mainly due to the lesions of the optic nerve and cornea. Aetiology could be determined in only a small minority of cases. Infectious diseases accounted for 0·5 per cent, trauma for 0·4 per cent, poisonings (including the therapeutic use of oxygen in premature infants) for 0·3 per cent, and tumours for 0·9 per cent. Systemic diseases regarded as causative of the ocular lesion (such as diabetes in diabetic retinopathy, or multiple sclerosis in optic atrophy) were present in 12·7 per cent, and pre-natal pathogenic influences in 5·4 per cent. The bulk of cases—no less than 79·8 per cent—were of unknown aetiology—a group that included such major entities as 'senile' macular lesions, 'senile' cataract, 'myopic' chorioretinal atrophy, retinal detachment, glaucoma and the mass of inflammatory disorders.

Table 8 (based on Table B of the Appendix) gives an analysis by clinical entities. It will be seen that three causes—'senile' macular lesions, cataract and glaucoma—account for 62·1 per cent of all cases, and two other affections—myopia and diabetic retinopathy—account for a further 15·9 per cent. Five disorders therefore contribute 78 per cent of all cases. Other substantial causes, or groups of causes, include the congenital defects which accounted for 3·2 per cent, the abiotrophic anomalies responsible for 2·0 per cent, uveitis for 3·0 per cent, vascular retinopathies for 3·2 per cent and optic atrophy of presumably environmental origin for 4·2 per cent. (Of the lesser causes, mustard gas keratitis was responsible for 2 cases in 1957 and for six in 1960).

Causes of blindness at different ages.

Table 9 sets out the causes of blindness responsible for 2 per cent or more of cases in the different age groups up to 60 for 1955-62, and for the ages over 60

TABLE 8

Clinical classification: entities responsible for more than 0·5 per cent of cases. 1955–60: all ages by sex

	Males			Females			Persons		
	No.		%	No.		%	No.		%
Congenital defects:									
Globe as a whole (including multiple defects)		346			268			614	
Lens:									
Cataract	332			274			606		
Dislocation	24	356		20	294		44	650	
Uveal tract:									
Malformations	4			3			7		
Congenital syphilis	17			13			30		
Toxoplasmosis	—	21		1	17		1	38	
Retina:									
Retrolental fibroplasia	73			78			151		
Aplasia	13			12			25		
Retinoblastoma	21			14			35		
Congenital detachment	2	109		1	105		3	214	
Optic atrophy		219			117			336	
			1,051	4·9		801	2·2		1,852	3·2
Abiotrophic defects:									
Cornea:									
Dystrophies	6			13			19		
Keratoconus	7	13		26	39		33	52	
Choroidal dystrophies		5			4			9	
Retina:									
Retinitis pigmentosa and allied affections	568			445			1,013		
Macular dystrophy	45			47			92		
Detachment: genetic	4	617		1	493		5	1,110	
			635	2·9		536	1·5		1,171	2.0
Glaucoma			3,134	14·5		4,219	11·5		7,353	12·6
Interstitial keratitis			85	0·4		188	0·5		273	0·5
Primary cataract 'senile'			3,951	18·3		9,214	25·1		13,165	22·6
Iritis and iridocyclitis:										
Aetiology established		38			65			103		
Undetermined		403	441	2·1	817	882	2·4	1,220	1,323	2·3
Choroiditis:										
Aetiology		33			26			59		
Undetermined		155	188	0·9	208	234	0·7	363	422	0·7
Myopia:										
Chorioretinal atrophy		1,575			3,312			4,887		
Detachment		141	1,716	8·0	107	3,419	9·3	248	5,135	8·8
'Senile macular lesions'			5,765	26·7		9,923	27·0		15,688	26·9
Retinal detachment (idiopathic)			227	1·0		163	0·5		390	0·7
Diabetic retinopathy			946	4·4		3,164	8·6		4,110	7·1
Hypertensive and vascular retinopathy			730	3·4		1,125	3·1		1,855	3·2
Optic atrophy (excluding congenital and genetic cases)			1,327	6·1		1,146	3·1		2,473	4·2
Presumed intracranial vascular lesion with normal globe			207	1·0		173	0·5		380	0·7
All other causes			1,151	5·4		1,531	4·0		2,682	4·5
Total			21,554	100·0		36,718	100·0		58,272	100·0

TABLE 9

The major causes of blindness at different age groups by sex (age at registration)
1955–62

Age group (years)	0–4				5–14				15–29				30–49				50–59				60–69*				70 and over*			
	M.	F.	P. No.	%	M.	F.	P. No.	%	M.	F.	P. No.	%	M.	F.	P. No.	%	M.	F.	P. No.	%	M.	F.	P. No.	%	M.	F.	P. No.	%
Congenital defects																												
Cataract	67	56	123	12·9	55	39	94	14·9	57	35	92	9·1	95	71	166	4·9	74	56	130	2·8	32	35	67	0·8	34	36	70	0·2
Optic atrophy	106	65	171	18·0	57	29	86	13·7	33	17	50	4·9	28	24	52	1·5	14	7	21	0·4	2	—	2	0·0	12	4	16	0·0
Other structural defects, including nystagmus	174	113	287	30·2	76	49	125	19·9	60	41	101	10·0	53	50	103	3·0	16	23	39	0·8	14	25	39	0·4	18	22	40	0·1
Ophthalmia neonatorum	—	1	1	0·1	—	—	—	—	5	1	6	0·6	8	12	20	0·6	6	8	14	0·3	3	14	17	0·2	1	11	12	0·0
Interstitial keratitis	—	—	—	—	—	—	—	—	1	2	3	0·3	17	37	54	1·6	23	52	75	1·6	25	43	68	0·8	16	37	53	0·1
Retrolental fibroplasia	70	71	141	14·9	11	19	30	4·8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Retinoblastoma	26	16	42	4·4	4	10	14	2·2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Retinal aplasia	11	8	19	2·0	5	3	8	1·3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Retinitis pigmentosa and allied conditions	1	—	1	0·1	16	9	25	4·0	86	40	126	12·4	252	141	393	11·6	142	151	293	6·2	83	90	173	2·0	72	90	162	0·4
Macular dystrophy	—	—	—	—	8	4	12	1·9	17	11	28	2·8	17	25	42	1·2	7	6	13	0·3	—	8	8	0·1	1	3	4	0·0
Retinal detachment																												
Myopic	—	—	—	—	7	1	8	1·3	11	2	13	1·3	48	23	71	2·2	52	27	79	1·7	27	35	62	0·7	12	31	43	0·1
Unspecified	4	3	7	0·8	2	4	6	1·0	15	5	20	2·0	68	31	99	2·9	75	47	122	2·6	57	52	109	1·3	51	47	98	0·2
Myopic chorioretinal atrophy	2	1	3	0·3	14	4	18	2·9	33	19	52	5·2	197	187	384	11·3	329	524	853	18·1	452	919	1,371	16·1	666	1,774	2,440	5·9
Glaucoma	—	—	—	—	—	—	—	—	10	2	12	1·2	64	49	113	3·3	197	206	403	8·6	634	598	1,232	14·5	2,263	3,379	5,642	13·7
Cataract: 'senile'	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	182	188	370	7·9	423	905	1,328	15·6	3,356	8,110	11,466	27·9
Senile macular lesions	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	36	59	1·2	293	412	705	8·3	5,411	9,432	14,843	36·1
Diabetic Retinopathy	—	—	—	—	—	1	1	0·1	27	17	44	4·3	222	144	366	10·8	212	505	717	15·2	291	1,127	1,418	16·7	297	1,490	1,787	4·4
Affections of globe as a whole	—	—	—	—	—	—	—	—	2	4	6	0·6	8	5	13	0·4	2	16	18	0·4	4	28	32	0·4	6	37	43	0·1
Hypertensive and vascular retinopathy	—	—	—	—	—	—	—	—	1	1	2	0·2	20	14	34	1·0	70	76	146	3·1	163	222	385	4·5	493	825	1,318	3·2
Iritis and iridocyclitis of undetermined origin	2	3	5	0·5	9	7	16	2·5	17	24	41	4·1	81	97	178	5·3	84	136	220	4·7	88	197	285	3·4	153	399	552	1·4
Optic atrophy, known or presumed acquired	58	42	100	10·5	73	63	136	21·6	145	97	242	23·9	387	247	634	18·7	249	189	438	9·3	219	157	376	4·4	424	505	929	2·3
Corneal lesions: unspecified	3	—	3	0·3	4	3	7	1·1	9	9	18	1·7	39	56	95	2·8	69	111	180	3·8	116	189	305	3·6	184	401	585	1·4
Trauma	3	4	7	0·8	7	2	9	1·4	38	7	45	4·4	61	8	69	2·0	46	5	51	1·1	35	10	45	0·5	41	16	57	0·1
All other causes	21	19	40	4·2	22	12	34	5·4	61	50	111	11·0	279	225	504	14·9	224	241	465	9·9	207	262	469	5·5	397	569	966	2·4
	548	402	950	100·0	370	259	629	100·0	628	384	1,012	100·0	1,944	1,446	3,390	100·0	2,096	2,610	4,706	100·0	3,168	5,328	8,496	100·0	13,908	27,218	41,126	100·0

*1955-60 only.

for the years 1955-60 only. The essential findings are shown diagrammatically in Fig. 1, (based on causes giving more than 5 per cent of cases) and may be summarized thus:

1. *At* 0-4 *years.* Congenital defects account for 61·1 per cent of all cases, followed by retrolental fibroplasia with 14·9 per cent, optic atrophy of presumed environmental origin with 10·5 per cent, and retinoblastoma with 4·4 per cent. A striking point is the absence of infection amongst the substantial causes of blindness.

2. *At* 5-14 *years.* Congenital defects lead with 48·5 per cent of cases, followed by optic atrophy of presumed environmental origin with 21·6 per cent. Less significant causes are retrolental fibroplasia with 4·8 per cent and retinitis pigmentosa and allied conditions with 4·0 per cent.

3. *At* 15-29 *years.* Congenital defects and optic atrophy of presumed environmental origin are equally significant with 24·0 and 23·9 per cent respectively. Abiotrophic lesions—retinitis pigmentosa and macular dystrophy—account for 15·2 per cent, whilst each of four causes account for about 4 to 5 per cent of cases (myopic chorioretinal atrophy 5·2 per cent, diabetes 4·9 per cent, trauma 4·4 per cent and iritis 4·1 per cent).

4. *At* 30-49 *years.* Optic atrophy of environmental origin is the leading cause with 18·7 per cent of cases. Retinitis pigmentosa accounts for 11·6 per cent, whilst myopic chorioretinal atrophy and diabetes follow closely with 11·3 per cent and 11·2 per cent. Congenital anomalies now fall to 9·4 per cent of the total. Iritis and iridocyclitis give 5·3 per cent and retinal detachment 5·1 per cent of cases.

5. *At* 50-59 *years.* The two leading causes are myopic chorioretinal atrophy and diabetes with 18·1 per cent and 15·6 per cent respectively. Optic atrophy, glaucoma and presumed 'senile' cataract give 9·3 per cent, 8·6 per cent and 7·9 per cent respectively. Other significant causes are retinitis pigmentosa (6·2 per cent), iritis and iridocyclitis (4·7 per cent) and retinal detachment (4·3 per cent).

6. *At* 60-69 years. Four causes are responsible for about 15 per cent each: diabetes is the dominant cause with 17·1 per cent of cases, followed by myopic chorioretinal atrophy with 16·1 per cent, by cataract with 15·6 per cent and by glaucoma with 14·5 per cent. 'Senile' macular lesions accounted for 8·3 per cent. Lesser causes are hypertensive retinopathy (4·5 per cent), optic atrophy (4·4 per cent), corneal lesions (3·6 per cent) and iritis and iridocyclitis (3·4 per cent).

7. *At* 70 *years and over.* There are three major affections: the so-called senile macular lesions accounted for 36·1 per cent, followed by cataract with 27·9 per cent and glaucoma with 13·7 per cent. Myopic chorioretinal atrophy, diabetes and hypertensive retinopathy give 5·9 per cent, 4·5 per cent and 3·2 per cent respectively.

Sex differences in the causes of blindness.

It has already been seen that the markedly greater number of females amongst the newly registered conceals a male excess in the ages up to 50 and that the marked female excess asserts itself progressively between 50 and 80. Table 10, based on Table B and Table 9, sets out the data for the major causes of blindness

CAUSE OF BLINDNESS RESPONSIBLE FOR MORE THAN 5 PER CENT OF CASES IN THE DIFFERENT AGE GROUPS

1955 - 62

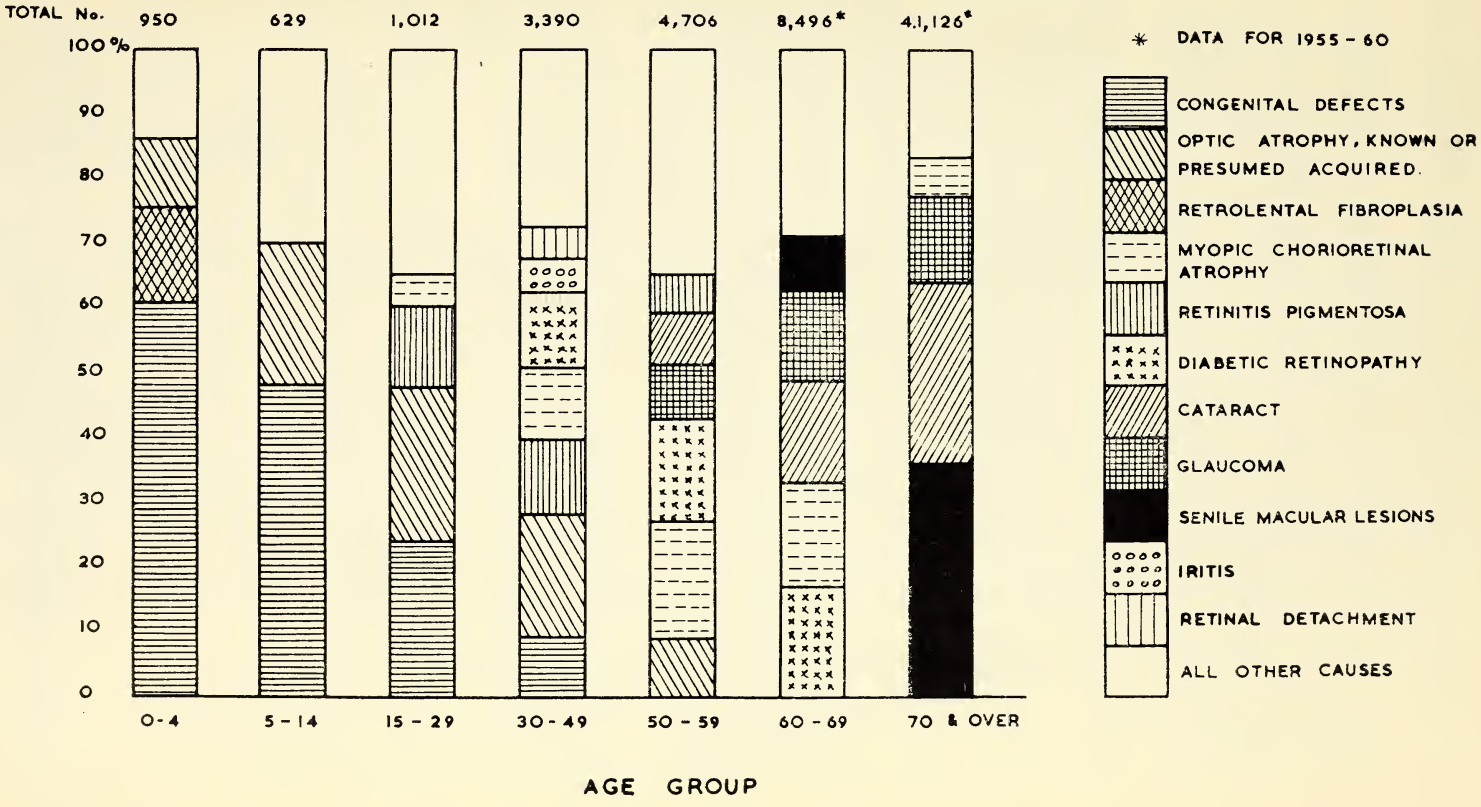

TABLE 10

The major causes of blindness by sex

Adjusted female incidence* against actual male incidence

1955–62**

Age group (years)	0–4		5–14		15–29		30–49		50–59		60–69		70 and over		All ages	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Congenital defects																
Cataract	67	59	55	41	57(1)	35	95(1)	69	74(1)	52	32	26	34	22	414(3)	304
Optic atrophy	106(2)	68	57(2)	30	33(1)	17	28	23	14	6	2	—	12(2)	2	252(3)	146
Other structural defects, including nystagmus	174(2)	119	76(1)	51	60	41	53	49	16	21	14	19	18	13	411(3)	313
Ophthalmia neonatorum	—	1	—	—	5	1	8	12	6	7	3	10	1	7(1)	23	38(1)
Interstitial keratitis	—	—	—	—	1	2	17	36(2)	23	48(2)	25	32	16	22	82	140(3)
Retrolental fibroplasia	70	75	11	20	—	—	—	—	—	—	—	—	—	—	81	95
Retinoblastoma	26	17	4	10	—	—	—	—	—	—	—	—	—	—	30	27
Retinal aplasia	11	8	5	3	—	—	—	—	—	—	—	—	—	—	16	11
Retinitis pigmentosa and allied conditions	1	—	16	9	86(3)	40	252(3)	138	142	139	83	67	72	54	652(3)	447
Macular dystrophy	—	—	8	4	17	11	17	24	7	6	—	6(1)	1	2	50	53
Retinal detachment																
Myopic	—	—	7(1)	1	11(1)	2	48(2)	22	52(2)	25	27	26	12	19	157(3)	95
Unspecified	4	3	2	4	15(1)	5	68(3)	30	75(2)	43	57	39	51(2)	28	272(3)	152
Myopic chorioretinal atrophy	2	1	14(1)	4	33	19	197	183	329	483(3)	452	685(3)	666	1,064(3)	1,693	2,439(3)
Glaucoma	—	—	—	—	10(1)	2	64	48	197	190	634(3)	446	2,263(3)	2,027	3,168(3)	2,713
Cataract: 'senile'	—	—	—	—	—	—	—	—	182	173	423	674(3)	3,356	4,866(3)	3,961	5,713(3)
'Senile' macular lesions	—	—	—	—	—	—	—	—	23	33	293	307	5,411	5,659(1)	5,727	5,999(1)
Diabetes																
Retinopathy	—	—	—	1	27	17	222(3)	141	212	465(3)	291	840(3)	297	894(3)	1,049	2,358(3)
Affections of Globe as a whole	—	—	—	—	2	4	8	5	2	15(2)	4	21(3)	6	22(2)	22	67(2)
Hypertensive and vascular retinopathy	—	—	—	—	1	1	20	14	70	70	163	165	493	495	747	745
Iritis and iridocyclitis of undetermined origin	2	3	9	7	17	24	81	95	84	125(2)	88	147(3)	153	239(3)	434	640(3)
Optic atrophy, known or presumed acquired	58	44	73	66	145(2)	97	387(3)	241	249(3)	174	219(3)	117	424(3)	303	1,555(3)	1,042
Corneal lesions: unspecified	3	—	4	3	9	9	39	55	69	102(1)	116	141	184	241(2)	424	551(3)
Trauma	3	4	7	2	38(3)	7	61(3)	8	46(3)	5	35(3)	7	41(3)	10	231(3)	43
All other causes	21	20	22	12	61	50	279	220	224	222	207	195	397	341	1,211	1,060
	548(3)	422	370(3)	268	628(3)	384	1,944(3)	1,413	2,096	2,404(3)	3,168	3,970(3)	13,908	16,330(3)	22,662	25,191(3)

* Method of adjustment: in each age group the female population blind from all causes, and from individual causes, was divided by the ratio Female/Male in the estimated home population for mid-year 1958 to obtain comparable figures.

** For 1961 and 1962 the data were for the age groups up to 60 years only.

(1), (2), (3), significant at ·05, ·01 and ·001 levels respectively.

by sex, the numbers for females having been adjusted to allow for the disproportion of the sexes in the individual age groups in the general population.

Overall differences. It will be seen from the last two columns that for all ages there is a highly significant male excess for the congenital defects, retinitis pigmentosa and allied affections, retinal detachment (both myopic and unspecified), glaucoma, acquired optic atrophy and traumatic lesions. An equally highly significant female excess is recorded for interstitial keratitis, myopic chorioretinal atrophy, cataract, diabetic retinopathy, iritis and iridocyclitis and for the non-descript group of corneal lesions. The female excess is of such a high order that a highly significant excess is recorded for the total of all causes.

Differences at particular age groups. When the various age groups are considered the following conclusions emerge:

(1) There is a marked male excess for the total of causes of blindness up to the age of 50. Subsequently there is an equally significant excess for females.

(2) At the age groups 0-4 and 5-14 years the only significant sex difference is the male excess for congenital defects.

(3) In the age groups 15-29 and 30-49 retinitis pigmentosa, trauma, acquired optic atrophy and retinal detachment (both myopic and unspecified) emerge as showing a significant male excess. Two features call for special stress: (*a*) the only female excess in the ages up to 50 is that shown by interstitial keratitis at 30-49 years; (*b*) diabetic retinopathy shows a highly significant male excess at 30-49 years—in striking contrast to the highly significant female excess for this cause at the subsequent age groups.

(4) At 50-59 years a highly significant male excess is shown for only acquired optic atrophy and traumatic lesions, with a lesser excess for retinal detachment. For females there is a highly significant excess for myopic chorioretinal atrophy and diabetic retinopathy, with a lesser excess for interstitial keratitis and iritis and iridocyclitis.

(5) For the two age groups 60-69 years and 70 and over, the general pattern is very much the same. There is a significant male excess for glaucoma, acquired optic atrophy and traumatic lesions, and a significant female excess for myopic chorioretinal atrophy, cataract, diabetic retinopathy and iritis and iridocyclitis.

Some unsubstantiated suggestions. On this assessment some sex differences suggested by the crude data in Table 9 become of little importance. Thus the apparent female excess for 'senile' macular lesions assumes little significance, whilst hypertensive retinopathy with its apparent female excess is now seen to have no sex difference. Glaucoma and optic atrophy which appear to show a female excess now actually show a male excess.

Treatment in cataract

It will be seen from Table 11 that during 1955-60 the number of registrations for blindness from cataract came to 13,219 and that no less than 11,380 or

TABLE 11

Cataract: incidence of (a) cases that have had no surgical treatment, (b) cases with incompleted surgical treatment, and (c) cases recommended for operation

1955–60

Year	Total number registered as blind from cataract			Cases that have had no surgical treatment						Cases with incomplete surgical treatment						Cases recommended for operation					
				Number			Percentage			Number			Percentage			Number			Percentage		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1955	673	1,539	2,212	534	1,307	1,841	79·3	85·1	83·2	114	174	288	17·0	11·3	13·0	255	509	764	37·9	33·1	34·5
1956	773	1,698	2,471	654	1,504	2,158	84·6	88·7	87·3	100	176	276	12·9	10·4	11·2	277	490	767	35·8	28·9	31·0
1957	686	1,571	2,257	582	1,400	1,982	84·8	89·3	87·8	90	150	240	13·1	9·5	10·6	250	488	738	36·4	31·1	32·7
1958	598	1,424	2,022	508	1,252	1,760	85·0	88·1	87·0	74	153	227	12·4	10·7	11·2	212	485	697	35·5	34·1	34·5
1959	629	1,527	2,156	528	1,297	1,825	83·9	85·1	84·6	79	201	280	12·6	13·2	13·0	219	451	670	34·8	29·5	31·1
1960	621	1,480	2,101	532	1,282	1,814	85·7	88·1	86·3	71	144	215	11·4	9·7	10·2	214	436	650	34·5	29·5	30·9
1955–60	3,980	9,239	13,219	3,338	8,042	11,380	83·9	87·0	86·1	528	998	1,526	13·7	10·8	11·5	1,427	2,859	4,286	35·9	30·9	32·4

86·1 per cent had received no surgical treatment. In a further 11·5 per cent treatment had not been completed. Of those registered as blind from cataract, 32·4 per cent were however cases recommended for operation by the certifying examiner

Annual variations

Causes of blindness

Section (a) of Table 12 sets out the major groups of causes by sex for the

TABLE 12

Annual variations

(*a*) *Annual distribution of major causes of blindness in* 1955–60

	MALES						FEMALES					
	1955	1956	1957	1958	1959	1960	1955	1956	1957	1958	1959	1960
Congenital defects (optic atrophy excluded)	46	65	54	52	71	58	46	63	40	44	34	41
Retinitis pigmentosa and allied affections	86	107	100	93	116	111	74	97	85	77	73	86
Glaucoma	515	558	510	499	531	521	636	729	710	709	677	758
Senile cataract	673	769	679	590	619	621	1,539	1,695	1,560	1,420	1,520	1,480
'Senile' macular lesions	835	1,004	984	909	950	1,083	1,477	1,588	1,629	1,657	1,748	1,824
Diabetic retinopathy	125	165	154	150	171	181	480	546	509	557	501	571
Myopic chorioretinal atrophy	213	279	300	253	259	271	466	617	573	513	552	591
Optic atrophy (including the congenital type)	254	268	284	236	267	232	180	229	195	216	222	219
All other causes	598	654	630	570	626	605	769	878	886	747	788	797
All causes	3,345	3,869	3,695	3,352	3,610	3,683	5,667	6,442	6,187	5,940	6,115	6,367

years 1955–60 by all ages. Whilst there are annual fluctuations for the different groups, it is difficult to attach any clear significance to them. There is a strong suggestion of an increasing incidence in diabetic lesions in both males and females.

A clearer appreciation is possible if the different age groups are considered. Perusal of the relevant returns show that only two affections suggest any substantial variation over the years. These are retrolental fibroplasia in children and 'senile' macular lesions in the elderly. The data are summarised in section (*b*) of Table 12.

TABLE 12—*cont.*

(*b*) *Annual distribution of cases of retrolental fibroplasia in children* (1955-62) *and of senile macular degeneration in the elderly* (1955-60)

Year:		1955	1956	1957	1958	1959	1960	1961	1962
		Retrolental fibroplasia							
0–4 years		42	41	16	8	12	9	5	8
5–14 years		1	6	3	6	5	2	5	2
		'Senile' macular degeneration							
70 years	M.	775	947	936	849	889	1,015	Not	
and over	F.	1,392	1,502	1,541	1,581	1,682	1,734	analysed	

(*c*) *Annual distribution of diabetic retinopathy in the different age groups during* 1955-62.

		1955	1956	1957	1958	1959	1960	1961	1962
5–14 years	M.	—	—	—	—	—	—	—	—
	F.	—	—	—	—	1	—	—	—
15–29 years	M.	3	3	2	4	5	4	3	3
	F.	2	2	2	—	3	4	2	2
30–49 years	M.	17	36	22	26	37	34	22	28
	F.	14	15	18	19	22	22	19	15
50–59 years	M.	14	26	22	24	26	36	28	36
	F.	58	66	57	64	59	64	65	72
60–69 years	M.	45	46	51	51	46	52		
	F.	172	199	197	195	160	204	Not	
70 years and	M.	42	51	54	41	54	55	analysed	
over	F.	221	259	220	267	249	274		

It is particularly noteworthy that the suggestion of a steady increase of diabetic lesions is hardly borne out by an analysis by age groups. It will be seen from section (*c*) of Table 12 that the annual fluctuations in the number of cases with diabetic retinopathy do not give any consistent rise, except possibly in men at 50 to 59 and in women aged 70 and over. It is likely that the incidence of diabetic retinopathy is now fairly stationary if allowance is made for the increase in the population at the higher age groups.

Treatment in cataract

It has been seen in Table 11 that the total number of those registered as blind from cataract suggests a downwards trend for both sexes over the years 1955-60. The data also suggest that there is a decrease in the number of those suitable for operation amongst the newly registered. On this reading, more people blind from cataract do actually seek and obtain surgical relief.

Degree of blindness

There was no substantial annual variation in the numbers with the different degrees of blindness, though there may possibly be fewer totally blind and with perception of light only. This is suggested by the yearly averages in the three years 1955-57 set against those for the three years 1958-60. For the totally blind the figure was 371 against 316; for those with perception of light only it was 1,137 against 1,002.

TABLE 13

Comparison of age distribution by sex of those blinded by the same cause and by a different cause in the two eyes
1955–60

	Blindness from the same cause in both eyes			Blindness from a different cause in each eye		
	Percentage distribution					
	M.	F.	P.	M.	F.	P.
Number on which age and sex are known:	21,371	36,425	57,796	1,894	1,918	3,812
0 –29 years	5·6	2·2	3·5	1·5	0·3	0·9
30–49 „	7.0	3·0	4·5	3·9	1·4	2·7
50–59 „	7·5	5·5	6·2	6·9	4·9	5·9
60–69 „	14·8	14·6	14·7	17·5	12·1	14·8
70 years and over	65·1	74·7	71·1	70·2	81·3	75·7
	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 14

Blindness from a different cause in the two eyes
Causes of blindness responsible for more than 0·5 per cent of specified causes: each eye listed separately
1955–60

	1955		1956		1957		1958		1959		1960		1955–60					
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M. No.	%	F. No.	%	P. No.	%
Trauma	155	75	206	69	144	65	142	66	167	68	152	63	966	25·2	406	10·5	1,372	17·8
Cataract (Senile)	153	207	142	172	101	160	108	142	128	176	110	160	742	19·4	1,017	26·2	1,759	22·8
Glaucoma	79	84	78	54	51	83	51	68	68	76	68	79	395	10·3	444	11·4	839	10·9
'Senile' macular lesions	80	68	67	67	53	64	59	65	75	59	71	55	405	10·6	378	9·7	783	10·2
Myopic chorio-retinal atrophy	23	27	16	22	22	14	14	21	12	20	16	19	103	2·7	123	3·2	226	2·9
All detachment (trauma excluded)	23	27	19	26	16	13	12	23	17	21	14	22	101	2·6	132	3·4	233	3·0
Infectious diseases	4	5	7	8	5	9	6	9	7	10	10	10	39	1·0	51	1·3	90	1·2
Tumours (ocular)	3	4	—	4	4	2	6	2	3	3	5	4	21	0·5	19	0·5	40	0·5
Hypertensive and vascular retinopathy	73	73	50	61	51	42	40	58	58	73	60	70	332	8·7	377	9·7	709	9·2
Optic atrophy (trauma excluded)	25	21	14	17	22*	18	14*	12	21	19	15	9	111	2·9	96	2·5	207	2·7
Iritis and iridocyclitis	11	11	10	16	2	19	7	19	14	13	12	16	56	1·5	94	2·4	150	1·9
Amblyopia ex anopsia	37	55	20	33	17	26	16	6	20	15	11	12	121	3·1	147	3·8	268	3·5
All other causes	116	141	69	125	60	77	55	87	74	73	60	57	440	11·5	596	15·4	1,036	13·4
	782	798	698	674	554	592	530	578	664	626	604	612	3,832	100·0	3,880	100·0	7,712	100·0

* 1 case due to infection excluded.

In 1955-60 there were 3,856 persons who showed a different cause of blindness in each eye, constituting 6·2 per cent of the total. In contrast to the major group the two sexes were fairly evenly represented, and there were fewer registered at the lower age groups. Table 13 gives the comparative figures.

In 1961, when the analysis was limited to ages up to 60, there were only 33 certificates for those blinded by a different cause in each eye; for 1962 (with an analysis extending up to 64 years) there were 54 certificates.

Causes of blindness

The causes in 7,712 eyes are given in Table 14. It will be seen that cataract and trauma are the outstanding causes, reponsible for 22·8 and 17·8 per cent of eyes, with glaucoma and 'senile' macular lesions following with some 10 per cent each. For the group as a whole it may therefore be taken that the largest proportion had lost the sight of one eye from cataract and that generally the sight of the other had been lost—probably earlier in life—from trauma or glaucoma. In some patients the sight had been lost late in life from 'senile macular lesions' in one eye and cataract in the other.

Sex differences

There was no substantial sex difference except for trauma. Table 15 sets out

TABLE 15

Percentage distribution by sex of the different varieties of trauma as a cause of unilateral blindness: each eye listed separately. 1955–60

	Males	Females	Persons
Number of eyes blinded by trauma	966	406	1,372
	Percentage of all Causes		
Occupational activities	8·6	0·5	4·5
Household activities	0·7	1·4	1·0
Play or sport	3·8	2·2	3·0
Traffic or travel	0·4	0·2	0·3
Military operations	2·3	0·5	1·4
Sympathetic ophthalmia	2·0	2·0	2·0
Other activities not specified or inadequately specified	7·4	3·7	5·6
	25·2	10·5	17·8
All other causes	74.8	89.5	82.2
	100·0	100·0	100·0

the data for trauma by sex. It will be seen that there is some male proportionate excess for military operations and a particularly marked excess (both proportionate and actual) for occupational activity.

Sympathetic ophthalmia

Sympathetic ophthalmia was responsible for 155 cases during 1955-60. Their distribution by exciting cause is shown in Table 16. It will be seen that there is a

TABLE 16

Sympathetic ophthalmia: exciting causes
1955–60

	1955		1956		1957		1958		1959		1960		1955–60		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	P.
Following:															
Cataract operation	6	13	6(a)	6	2	10	2	6	5	9	4	7	25(a)	51	76
Glaucoma operation	2	2	1	5	—	1	1	2	—	—	1	1	5	11	16
Other operations(b)	—	—	1	—	—	—	1	—	1	1	1	—	4	1	5
Trauma:															
Occupational	2	—	3	—	1	—	5	—	3	1	1	—	15	1	16
Household	—	—	1	2	—	1	—	—	—	1	—	1	1	5	6
Play or sport	3	—	5	—	3	—	5	2	1	—	1	1	18	3	21
Military	—	—	1	—	1	—	—	1	—	—	—	1	2	2	4
Not specified	2	3	3	—	—	1	—	—	—	1	1	—	6	5	11
	15	18	21	13	7	13	14	11	10	13	9	11	76	79	155

(a) Including two cases of dislocated lens in elderly patients.
(b) Recorded as operations for congenital defects of the eye.

marked sex difference in the causative factors. In males, both surgical and non-surgical injuries contribute with 34 and 42 cases respectively; in females, surgical injuries predominate—63 against 16. As for exciting causes cataract operations contribute 76 cases—almost half of the total number; glaucoma operations are not negligible, contributing 16 cases. Of the different types of trauma, injury at play or sport is the leading cause in males, followed by occupational injuries, in women, household injuries give the largest number of cases. Sympathetic ophthalmia due to operation, being almost exclusively a sequel of operations for cataract or glaucoma, occurs inevitably at the higher ages, but sympathetic ophthalmia following on non-surgical trauma shows a rather more complex age distribution. Of the 41 males of known age, 27 were aged 30 to 69 years; boys under 14 contributed only 3 and young men aged 15 to 29 contributed 5, and 6 were aged over 70. Of the 16 cases in females, 2 were girls under 15, whilst 12 were women over 50 years of age; there were no cases at 15 to 29 years and only 2 in the age group 30-49 years.

In the limited analysis for 1961 there were two cases, both in women, one following an occupational injury and the other an injury arising from sport. In 1962 there were 8 cases: 3 following cataract operations and 5 following injury (2 occupational, 1 play or sport, and 2 not specified).

Annual variations

In number, sex distribution, age distribution and causes of blindness, there were no substantial variations over the years 1955-60.

3. DATA FROM SUNSHINE HOMES

Table 17 sets out the diagnosis in 562 infants under 5 admitted to the Sunshine Homes during 1955 to 1962. It will be seen that no less than 201 of these infants

TABLE 17

Causes of blindness in children admitted to Sunshine Homes for Blind Babies
1955–62

	1955	1956	1957	1958	1959	1960	1961	1962	1955–62	
Infections:										
Endophthalmitis & pseudoglioma	—	1	2	—	2	2	1	5	13	
Encephalitis	—	—	—	—	—	—	—	1	1	
										14
Trauma:										
Accident (sympathetic ophthalmia)	—	—	—	—	1	—	—	—	1	
Birth injury	—	—	—	—	1	—	—	—	1	
										2
Congenital:										
'Congenital anomalies'	1	—	1	2	2	—	—	1	7	
Nystagmus	—	—	1	3	—	—	1	1	6	
Microphthalmos	3	4	3	3	2	3	2	4	24	
Anophthalmos	—	—	3	1	2	—	2	1	9	
Buphthalmos	6	2	7	3	1	1	1	4	25	
Optic atrophy	1	—	1	5	8	1	1	—	17	
Cataract	5	5	7	11	8	5	10	10	61	
Albinism	—	—	—	—	—	3	—	1	4	
Glioma (retinoblastoma)	3	4	2	2	4	6	1	2	24	
Aniridia	—	—	—	2	—	1	1	—	4	
Coloboma	1	2	—	2	1	—	1	—	7	
Retinal lesions	1	1	1	—	2	—	—	2	7	
Corneal lesions	—	2	—	3	—	1	2	—	8	
Cortical blindness	4	3	3	4	5	4	3	5	31	
Other presumed congenital affections*	1	—	—	—	1	1	—	—	3	
										237
Other affections:										
Optic atrophy of indefinite origin	8	12	11	8	10	14	12	8	83	
Detachment of retina	2	—	1	1	—	1	—	4	9	
Retrolental fibroplasia	48	41	35	25	22	8	12**	10	201	
Retinal atrophy	—	5	4	2	—	—	2	—	13	
Other affections and indefinite lesions	—	—	1	2	—	—	—	—	3	
										309
	84	82	83	79	72	51	52	59		562

* One case of myopia, cerebral atrophy and microcephaly.
** Including 2 doubtful cases.

were blind from retrolental fibroplasia, a figure only slightly less than the total for all congenital causes of blindness. Several points are noteworthy.

(1) Ophthalmia neonatorum does not figure at all as a cause of blindness.

(2) Infections are represented by 14 cases and these infections all appear to be systemic in character.

(3) Injuries are represented by only two cases.

(4) Amongst the congenital anomalies cataract leads with 61 cases. Microphthalmos, buphthalmos and retinoblastoma are represented with 24, 25 and 24 cases respectively. There is a strikingly high incidence of anophthalmos, represented by 9 cases. There were 17 cases of optic atrophy. A significant group —as many as 31 cases—is recorded as due to cortical blindness: most of these cases were presumably instances of retinal aplasia, and some of the 7 recorded as due to retinal lesions probably also belong here.

Apart from the 17 cases of optic atrophy known to be of congenital origin, there were as many as 83 cases of optic atrophy of indefinite origin. In all, optic atrophy accounted for almost 18 per cent of the cases. At Sunshine Homes during this period almost 54 per cent of the cases were therefore concentrated into two categories—retrolental fibroplasia and optic atrophy.

SECTION II

OVERALL SURVEY 1948-62

The material for an overall survey for the fifteen years since 1948 is extensive, but it is not entirely homogeneous. In the first place, certificates of registration for the West Country and for Wales—some 15 per cent of the total—became available for analysis only in 1955. Secondly, throughout the whole period the number of certificates received for study fell short of the total issued to a varying extent in different years; this called for adjustment year by year if any assessment of the trend in individual causes was to be attempted, the adjustment ratio being particularly high in the earlier years. Thirdly the change in the form of the certificate introduced in 1955 and in the method of analysis of the diagnoses and other data recorded, proved a hindrance in the assessment of some causes for which the older classification made no clear distinction between topography and aetiology. Finally the records for the earlier years were often not as full as those for the more recent years. Because of these difficulties an assessment of the trend over the past 15 years, though feasible enough in broad outline, was not always possible on some finer points.

1. THE INCIDENCE OF BLINDNESS

The Registered Blind

The number of registered blind rose steadily from 78,579 at March 31st, 1949 to 93,622 by December 31st, 1954 — an increase of over 15,000 in less than 6 years; during that period (mid-year 1948 to mid-year 1954) the general population increased by about 1 million from 43,296,000 to 44,274,000. In contrast, the total blind population, which stood at 94,683 at the end of 1955, rose by little more than 2,000 by December 31st, 1962, though the general population had increased during that period by some 2 million (from 44,667,000 at mid-year 1956 to 46,709,000 in 1962).

Much the most striking feature is the fact that though in the general population there was a female excess of the order of 6 per cent (in 1962), the Blind Register showed a female excess of some 47 per cent. This discrepancy reflects the marked sex difference in the age structure of the general population: it is the elderly population that contributes the bulk of the blind, and in the age groups over 50 there is an increasing disproportion between the sexes, the female excess reaching beyond 100 per cent in the age groups over 85.

The trends can best be assessed by rates per 100,000. Table 18 shows such rates for the registered blind population. It can be seen that the rate rose steadily from 181·4 in 1948 to 211·4 by 1954, less markedly during the three subsequent years reaching 215·4 in 1957, and that it has declined since then to 207·2 in 1962. The pattern is somewhat different when the rates are considered by sex. For males the rate per 100,000 showed a steady rise till 1954, and an equally steady decline since. For females there was a steady rise until 1957 and since then the rate has remained fairly stationary.

TABLE 18

The Registered Blind
Rates per 100,000 by sex
1948–62

	Number on Register			Home Population (in thousands)			Rate per 100,000		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
1948(1)	36,464	42,115	78,579	20,888	22,408	43,296	174·6	187·9	181·5
1949(1)	37,242	44,078	81,320	21,050	22,545	43,595	176·9	195·5	186·5
1950(1)	37,942	45,522	83,464	21,169	22,661	43,830	179·2	200·9	190·4
1951(1)	38,783	47,606	86,389	21,044	22,771	43,815	184·3	209·1	197·2
1952	39,509	49,087	88,596	21,110	22,845	43,955	187·2	214·9	201·6
1953	39,984	50,622	90,606	21.206	22,903	44,109	188·6	221·0	205·4
1954	40,626	52,996	93,622	21,288	22,986	44,274	190·8	230·6	211·5
1955	40,698	53,985	94,683	21,389	23,052	44,441	190·3	234·2	213·1
1956	40,803	55,216	96,019	21,517	23,150	44,667	189·6	238·5	215·0
1957	40,633	56,133	96 766	21,648	23,259	44,907	187·7	241·3	215·5
1958	40,114	56,361	96,475	21,744	23,365	45,109	184·5	241·2	213·9
1959	40,063	56,886	96,949	21,885	23,501	45,386	183·1	242·1	213·6
1960	39,965	57,504	97,469	22,070	23,685	45,755	181·1	242·8	213·0
1961	39,228	57,363	96,591	22,353	23,852	46,205	175·5	240·5	209·0
1962	39,123	57,606	96,729	22,660	24,049	46,709	172.7	239·5	207·1

(1) Blind population as shown on March 31st of the following year.

The rates per 100,000 for the blind population as a whole, or for the different age groups are all open to the objection that not all blind persons are in fact registered, for registration is not obligatory. This objection does not apply as forcibly to the blind of school age, for such children need certification to satisfy the education authorities responsible for their schooling and training. Only such blind children as are unsuitable for education might fail to be registered. Table 19 sets out the available data on the number of blind children and gives

TABLE 19

The registered blind under 16 years
1948–62

Age group: (years)	0–1		1–4		5–15					
	Numbers				Numbers			Rates per 100,000		
	M.	F.	M.	F.	M.	F.	P.	M.	F.	P.
1948	8	8	149	136	795	574	1,369	25·1	18·8	22·0
1949	17	11	168	160	789	575	1,364	24·5	18·5	21·5
1950	12	15	209	198	800	596	1,396	24·3	18·8	21·6
1951	20	20	267	220	803	639	1,442	24·0	19·9	22·0
1952	9	17	275	240	844	659	1,503	24·1	19·6	21·9
1953	16	5	298	268	873	666	1,539	24·2	19·3	21·8
1954	9	8	326	267	907	705	1,612	24·7	20·0	22·4
1955	10	3	307	252	955	725	1,680	25·6	20·3	23·0
1956	13	16	274	197	1,021	790	1,811	27·0	21·8	24·5
1957	5	1	252	163	1,060	818	1,878	27·6	22·3	25·0
1958	8	6	208	146	1,108	829	1,937	28·6	22·4	25·6
1959	9	—	202	128	1,098	856	1,954	28·2	23·1	25·7
1960	4	6	191	121	1,102	848	1,950	28·4	22·9	25·7
1961	5	2	174	120	1,099	846	1,945	28·1	22·7	25·5
1962	6	1	168	122	1,091	865	1,956	27·8	23·2	25·5

TABLE 20

New registrations by major age groups
1948–62

Age groups (years):	0–15			16–49			50–59			60–69			70 and over			All known ages		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1948	167	127	294	518	420	938	(1,070(a)	1,428(a)	2,498(a))				1,907	2,966	4,873	3,662	4,941	8,603
1949	161	143	304	563	454	1,017	388	459	847	788	1,165	1,953	2,412	4,108	6,520	4,312	6,239	10,641
1950	181	161	342	483	368	851	418	468	886	780	1,147	1,927	2,741	4,397	7,138	4,603	6,541	11,144
1951	217	183	400	470	385	855	394	505	899	823	1,178	2,001	2,633	4,662	7,295	4,537	6,913	11,450
1952*	180	155	335	437	341	778	395	444	839	821	1,173	1,994	2,668	4,527	7,195	4,501	6,640	11,141
1953	202	140	342	426	369	795	372	466	838	772	1,245	2,017	2,774	4,780	7,554	4,546	7,000	11,546
1954	197	146	343	400	346	746	360	462	822	727	1,243	1,970	3,047	5,563	8,610	4,731	7,760	12,491
1955	176	115	291	394	288	682	329	427	756	654	1,116	1,770	2,908	5,230	8,138	4,461	7,176	11,637
1956	170	102	272	394	313	707	348	400	748	698	1,175	1,873	2,989	5,470	8,459	4,599	7,460	12,059
1957	137	93	230	342	263	605	344	400	744	693	1,014	1,707	2,764	5,225	7,989	4,280	6,995	11,275
1958	148	104	252	356	239	595	316	373	689	637	1,064	1,701	2,551	4,990	7,541	4,008	6,770	10,778
1959	131	98	229	413	242	655	329	375	704	732	997	1,729	2,789	5,472	8,261	4,394	7,184	11,578
1960	137	78	215	344	239	583	331	445	776	680	1,086	1,766	2,838	5,490	8,328	4,330	7,338	11,668
1961	118	86	204	331	246	577	294	371	665	631	960	1,591	2,535	5,245	7,780	3,909	6,908	10,817
1962	114	106	220	347	259	606	301	350	651	700	970	1,670	2,858	5,497	8,355	4,320	7,182	11,502

(a) 50–69 years.
* Adjusted on the data for 9 months April-December 1952.

the rate per 100,000 for the age group 5-15. It will be seen that in this fairly fully registered group there has been an increase in numbers since 1948; in terms of rates per 100,000 there was no decline during 1948 to 1953, a steady rise during 1954-58, and a stationary rate since.

The New Registrations

Between 1949 and 1962 the annual number of new registrations has been around 11 to 12 thousand (Table 20). The relatively stationary number hides a considerable shift in the numbers at the different age groups. In the age groups 16-49, 50-59 and 60-69 there has been a substantial decline in numbers. At 0-15 a rise in numbers during the earlier years has been succeeded by a decline, followed by a fairly stationary number since 1957. The increase in the earlier years was largely confined to the ages of 0-5 years (Table 20a). At the highest age group—70 years and over—the numbers have been rising almost uninterruptedly.

TABLE 20a

New registrations aged 0–15 years
1948–62

Age groups	0 – 1			1 – 4			5 – 15		
	M.	F.	P.	M.	F.	P.	M.	F.	P.
1948	11	10	21	71	47	118	85	70	155
1949	20	14	34	61	61	122	80	68	148
1950	21	23	44	70	66	136	90	72	162
1951	41	33	74	87	77	164	89	73	162
1952*	24	32	56	69	67	136	87	56	143
1953	31	24	55	81	66	147	90	50	140
1954	28	23	51	84	69	153	85	54	139
1955	23	11	34	82	57	139	71	47	118
1956	23	11	34	80	46	126	67	45	112
1957	16	9	25	60	44	104	61	40	101
1958	21	14	35	42	45	87	85	45	130
1959	22	9	31	56	42	98	53	47	100
1960	13	11	24	61	39	100	63	28	91
1961	16	6	22	51	47	98	51	33	84
1962	12	10	22	50	49	99	52	47	99

*Adjusted on the data for 9 months April -December, 1952.

A clearer appreciation of the trends is shown in Table 21 which gives the

TABLE 21

New registrations
Rates per 100,000 in some age groups

Age groups	0–1	1–4	5–15	16–39	40–49	50–59	60–64	65–69	70 and over	All ages
MALES										
1948	2·7	4·8	2·7	3·6	7·8	20·0	54·2	163·8	17·5
1949	5·3	4·0	2·5	4·1	8·0	16·6	32·0	62·1	203·5	20·5
1950	5·9	4·5	2·7	3·5	6·9	17·6	32·9	59·3	227·3	21·8
1951	11·9	5·6	2·7	3·6	6·4	16·4	36·4	61·4	220·2	21·6
1952	7·2	4·7	2·5	3·3	6·1	16·0	36·7	60·4	221·0	21·3
1953	9·1	5·8	2·5	3·1	6·2	14·7	32·4	59·2	226·8	21·4
1954	8·2	6·2	2·3	3·2	5·4	13·9	33·6	51·5	245·5	22·2
1955	6·9	6·1	1·9	3·0	5·5	12·4	25·8	51·6	233·0	20·9
1956	6·6	6·0	1·8	2·9	5·9	12·8	28·7	52·9	238·2	21·4
1957	4·5	4·4	1·6	2·7	4·8	12·3	27·5	52·8	217·1	19·8
1958	5·7	3·1	2·2	2·6	5·6	11·1	27·7	44·9	200·6	18·4
1959	5·8	4·0	1·4	3·1	6·3	11·3	30·5	51·9	218·7	20·1
1960	3·4	4·2	1·6	2·6	5·1	11·2	23·4	53·0	220·0	19·6
1961	4·0	3·5	1·3	2·3	5·2	9·9	19·5	50·6	197·0	17·5
1962	2·9	3·3	1·3	2·5	5·0	10·1	23·1	52·5	220·4	19·1
FEMALES										
1948	2·6	3·4	2·3	2·6	6·7	21·3	59·2	175·8	22·1
1949	3·9	4·2	2·2	3·0	6·7	16·6	38·3	70·0	237·7	28·0
1950	6·7	4·5	2·3	2·5	5·3	16·7	39·4	65·9	248·6	28·9
1951	10·1	5·2	2·3	2·4	6·3	17·8	35·1	71·7	257·1	30·4
1952	10·0	4·8	1·7	2·2	5·4	15·5	34·5	70·9	242·7	29·1
1953	7·4	5·0	1·4	2·3	5·9	16·0	36·2	75·0	251·3	30·6
1954	7·0	5·3	1·5	2·2	5·5	15·7	36·8	73·1	284·4	33·8
1955	3·5	4·4	1·3	1·7	5·0	14·3	33·6	64·2	262·4	31·2
1956	3·3	3·6	1·2	1·9	5·2	13·2	33·2	69·0	268·8	32·2
1957	2·7	3·4	1·1	1·7	4·2	13·1	27·6	59·5	250·1	30·1
1958	4·0	3·5	1·2	1·4	4·3	12·0	30·5	59·6	235·3	29·0
1959	2·5	3·2	1·3	1·7	3·9	12·0	30·3	52·6	253·8	30·6
1960	3·1	2·9	0·8	1·7	3·8	14·1	28·8	60·8	248·9	31·0
1961	1·6	3·4	0·9	1·5	4·2	11·7	26·3	52·0	233·8	29·0
1962	2·5	3·4	1·3	1·5	4·6	11·0	26·9	51·0	241·7	28·7

rates per 100,000. All the age groups show a decline except that children under 5 show an increase in rates, and people of 70 years and over show an essentially stationary rate. In children, the increase is limited to particular years—the abnormal rates being shown in frames in the table; that this increase is entirely due to the influx of cases of retrolental fibroplasia, is seen from Table 22 which shows the rates at 0-5 years when the known cases of retrolental fibroplasia since 1951 are excluded; the downward trend from 5·06 per 100,000 in 1951 to 2·98 in 1962 is almost uninterrupted.

TABLE 22

New registrations at 0–5 years excluding the cases known to be due to retrolental fibroplasia
1951–62

Age group: (years)	Numbers 0–1 M.	0–1 F.	1–4 M.	1–4 F.	Rates per 100,000 0–5 M.	0–5 F.	0–5 P.
1951	23	20	79	67	5·34	4·78	5·06
1952*	9	19	54	47	3·51	3·85	3·68
1953	16	11	65	56	4·67	4·05	4·37
1954	21	10	75	55	5·63	4·00	4·84
1955	16	8	70	37	5·11	2·81	3·99
1956	12	9	64	34	4·50	2·68	3·61
1957	13	6	56	38	4·04	2·71	3·39
1958	19	13	42	40	3·51	3·21	3·36
1599	17	6	55	39	4·06	2·67	3·38
1960	13	10	58	34	3·90	2·54	3·24
1961	14	5	49	47	3·36	2·92	3·15
1962	12	9	48	44	3·09	2·88	2·98

*Computed on the returns for the 9 months April–December, 1952.

In the elderly, the stationary rate would seem to arise from some decline at 70-79 and some increase at 80 years and over. This is suggested by the data in Table 4, which gives the available information since 1957.

The effect of the shift in age distribution of the newly registered on the totals on the register by age is strikingly brought out in Table 23. The number of

TABLE 23

The blind population in 1957 and in 1962 by major age groups

	1957 M.	1957 F.	1957 P.	1962 M.	1962 F.	1962 P.
Age groups:						
0–15	1,317	982	2,299	1,265	988	2,253
16–49	7,852	5,790	13,642	7,203	5.203	12,406
50–59	5,325	5,095	10,420	5,166	4,784	9,950
60–69	7,589	9,431	17,020	7,232	9,044	16,276
70–79	10,002	16,527	26,529	9,257	16,240	25,497
80–89	7,647	15,301	22,948	7,835	17,443	25,278
90 and over	887	2,990	3,877	1,159	3,872	5,031
All known ages	40,619	56,116	96,735	39,117	57,574	96,691

newly registered in 1957 was very similar to that in 1962. The actual distribution over the different age groups was markedly dissimilar for these two years. At 0-15 years the numbers were very much the same, 2,299 and 2,253 respectively. At 16-49, 50-59, 60-69 and 70-79 the numbers in 1962 were lower than in 1957, but the reverse held good for the age groups 80-89 and 90 years and over: in the very last group—90 years and over—there were 5,031 in 1962 against 3,877 in 1957.

The trend towards an increasing proportion of those aged 70 and over amongst the newly registered has been noted in the previous studies (the proportion rose from 43·4 per cent in 1936 to 53·4 per cent in 1947) and Table 24 suggests that this trend is now coming to an end.

TABLE 24

New registrations—Persons 1948–62

The proportionate percentages at some age groups

Age group: (years)	0–49	50–69	70 and over
1948	14·3	29·0	56·7
1949	12·4	26·3	61·3
1950	10.7	25·2	64·1
1951	11·0	25·3	63·7
1952	10·0	25·4	64·6
1953	9·9	24·7	65·4
1954	8·7	22·4	68·9
1955	8·4	21·7	69·9
1956	8·1	21·7	70·2
1957	7·4	21·7	70·9
1958	7·9	22·1	70·0
1959	7·6	21·0	71·4
1960	6·8	21·8	71·4
1961	7·2	20·9	71·9
1962	7·2	20·2	72·6

2. THE DEGREE OF BLINDNESS

From the data in Table 25 it is clear that there have been considerable changes in recent years in the distribution of the different degrees of blindness amongst the newly registered. There has been a steady decline in the incidence of those with no perception of light and with perception of light only. An analysis in

TABLE 25

Degrees of blindness: percentage distribution 1948–60

	No. on which information is available	No perception of light	Perception of light only	Hand movements and up to 3/60	More than 3/60
1948–50	17,976	5·9	17·1	54·4	22·6
1951–54	33,005	4·6	13·4	55·8	26·2
1955–60	61,415	3·4	10·4	58·8	27·4

1953-54 (Table 4, Sorsby, 1956) showed a markedly higher incidence of the heavier degrees of visual defect for the younger age groups—a finding shown to an even more marked extent in Table 6 of the present study. The declining proportion of the more severe degrees of blindness in recent years is thus probably an aspect of the increasing proportion of the elderly amongst the newly registered.

BLINDNESS FROM THE SAME CAUSE IN BOTH EYES

It has already been pointed out that as the proportion of certificates available for analysis in the different years has not been constant—there were in particular fewer certificates for study in the earlier years—the material had to be adjusted before any comparative study of the individual causes of blindness could be attempted. This entailed computing the ratio of certificates analysed to the actual number of new registrations for each year and applying it to the material available.

Trends in the major causes of blindness

Adjusted numbers

Table 26 shows the ratio for adjustment in the different years from 1948 to 1960 (1961 and 1962 being excluded as only limited age groups were analysed in these two years) together with the adjusted figures by sex for the major causes of blindness. (The figures for 1948 differ from those of subsequent years on three important counts; in the first place, the total of new registrations for 1948 was low: 8,624, a figure of the same order as that of the preceding war years and the aftermath of the war; secondly, the certificates analysed covered only April to December; and thirdly the adjustment rate was high for the arrangements for analysis of the certificates were not yet fully organized. In consequence the year 1948 cannot be given the same weight as the subsequent years.) The following observations on the major causes are relevant.

Cataract. There was a steady decline in the number of men and women registered as blind from this affection.

'*Senile*' *macular lesions.* Here the opposite applies: there has been a steady increase over the years.

Glaucoma. No clear pattern is observed; there is perhaps a decline in men.

Myopic chorioretinal atrophy. There is no substantial change in males and a suggestion of an increase in females.

Diabetic retinopathy. This shows a striking increase for both men and women over the earlier years (1948-55) and a lesser increase in the subsequent years.

One further point of interest is the considerably higher numbers recorded for females for all affections, but particularly for diabetic retinopathy.

Rates per 100,000 *in the appropriate age groups.*

These crude data on the five numerically largest causes of blindness need to be assessed not only against the growing numbers in the general population, but also against the changes in age distribution. Rates per 100,000 were calculated for the most appropriate age groups not only for these five affections but also for iritis, hypertensive retinopathy, optic atrophy, and the congenital and the abiotrophic affections. These rates are shown in Table 27, and the following conclusions are warranted:

TABLE 26

The more significant causes of blindness in the new registrations
Adjusted numbers*: 1948–60

	Ratio for adjustment		Cataract			'Senile' macular degeneration			Glaucoma			Myopic chorioretinal atrophy			Diabetic retinopathy		
	M.	F.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1948	1·71	1·70	841	1,489	2,330	436	576	1,012	504	675	1,179	200	367	567	55	163	218
1949	1·41	1·40	1,079	1,928	3,007	615	791	1,406	522	834	1,356	309	545	854	80	265	345
1950	1·39	1·32	1,061	2,090	3,151	763	1,030	1,793	669	749	1,418	288	513	801	93	354	447
1951	1·44	1·40	948	1,953	2,901	818	1,177	1,995	625	889	1,514	274	564	838	92	360	452
1952	1·37	1·33	877	1,831	2,708	911	1,334	2,245	619	826	1,445	286	572	858	133	438	571
1953	1·42	1·42	878	1,852	2,730	937	1,395	2,332	636	814	1,450	231	537	768	145	466	611
1954	1·45	1·39	918	1,992	2,910	1,056	1,681	2,737	620	844	1,464	257	619	876	152	592	744
1955	1·20	1·19	808	1,831	2,639	1,002	1,758	2,760	618	757	1,375	256	555	811	150	571	721
1956	1·09	1·10	838	1,865	2,703	1,094	1,749	2,843	608	802	1,410	304	679	983	180	601	781
1957	1·08	1·08	733	1,685	2,418	1,063	1,759	2,822	551	767	1,318	324	619	943	166	550	716
1958	1·11	1·09	655	1,548	2,203	1,010	1,806	2,816	554	773	1,327	281	559	840	167	607	774
1959	1·12	1·12	693	1,702	2,395	1,064	1,958	3,022	595	758	1,353	290	618	908	192	561	753
1960	1·09	1·10	677	1,628	2,305	1,180	2,006	3,186	568	834	1,402	295	650	945	197	628	825

*Adjustment by computing the ratio of certificates analysed to the total of new registrations.

TABLE 27

Rates per 100,000 for the major causes of blindness at their most relevant age groups

By sex 1955–60: by persons 1948–60

	Cataract						'Senile' macular degeneration						Glaucoma					
Age group	60–69			70 and over			60–69			70 and over			60–69			70 and over		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1948			11·6			62·9			2·10			31·2			6·74			25·1
1949			10·6			82·6			2·87			43·1			7·15			32·1
1950			10·1			86·4			3·87			53·2			6·60			33·3
1951			7·95			80·2			3·99			56·6			7·27			34·8
1952			8·42			72·4			3·74			66·7			7·28			33·2
1953			8·63			73·0			4·36			68·4			7·56			33·1
1954			7·85			76·6			4·06			77·7			6·20			32·9
1955	5·08	8·13	6·82	54·3	80·2	70·2	3·14	3·38	3·27	74·5	83·1	79·7	6·56	4·45	5·35	36·8	30·2	32·7
1956	6·00	7·83	7·05	54·9	80·0	70·4	2·43	3·09	2·81	82·2	81·2	81·5	6·74	5·29	5·91	36·3	30·7	32·8
1957	3·91	6·43	5·36	50·1	71·4	63·3	2·57	3·30	2·99	79·4	79·7	79·5	6·32	4·09	5·04	30·6	29·9	30·1
1958	3·93	6·81	5·58	43·5	63·9	56·2	2·99	2·84	2·91	74·1	81·2	78·5	6·37	5·49	5·86	30·9	28·0	29·0
1959	3·60	6·06	5·01	46·9	70·8	61·9	3·38	2·89	3·21	78·1	87·4	83·9	7·41	4·11	5·52	32·4	29·1	30·3
1960	3·72	6·57	5·35	45·3	64·8	57·6	3·51	3·56	3·54	85·7	86·4	86·1	5·75	4·12	4·82	32·5	31·0	31·5

	Myopic chorio-retinal atrophy												Diabetic retinopathy								
Age group	30–49			50–59			60–69			70 and over			50–59			60–69			70 and over		
	M	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1948			0·63			2·58			5·38			6·76			0·67			2·48			3·05
1949			0·80			2·97			6·44			11·7			0·99			3·69			4·84
1950			0·69			2·96			6·09			11·6			1·27			4·90			6·05
1951			0·61			2·71			6·75			12·5			1·50			4·59			6·54
1952			0·53			2·64			6·58			12·8			1·91			5·68			6·39
1953			0·63			2·85			5·20			12·1			1·50			6·27			8·57
1954			0·55			2·66			6·50			14·4			1·89			7·33			10·4
1955	0·45	0·39	0·42	1·05	2·80	1·98	4·05	6·42	5·40	9·21	13·7	12·0	0·63	2·30	1·52	3·08	8·77	6·33	4·00	13·2	9·65
1956	0·41	0·50	0·46	1·57	2·04	1·82	5·04	8·89	7·24	10·4	17·8	15·0	1·02	2·41	1·75	2·83	9·27	6·52	4·46	14·0	10·3
1957	0·45	0·44	0·45	1·89	2·44	2·18	5·42	6·56	6·07	10·5	16·7	14·3	0·85	2·02	1·46	3·07	8·90	6·41	4·55	11·4	8·80
1958	0·43	0·35	0·39	2·03	2·77	2·41	3·54	6·64	5·32	10·0	13·2	12·0	0·94	2·25	1·62	3·15	8·79	6·38	3·61	13·7	9·93
1959	0·56	0·43	0·50	1·51	2·29	1·92	4·69	6·55	5·75	9·49	16·1	13·6	0·99	2·10	1·57	2·83	7·28	5·38	4·70	12·9	9·88
1960	0·45	0·44	0·44	1·79	2·46	2·14	5·00	7·29	6·31	8·83	16·3	13·5	1·32	2·21	1·78	3·03	8·97	6·42	4·65	13·6	10·3
1961	0·27	0·27	0·27	1·57	2·16	1·87							1·07	2·29	1·70						
1962	0·44	0·39	0·42	1·33	1·87	1·61							1·33	2·53	1·95						

TABLE 27 (*cont.*)

Rates per 100,000 for the major causes of blindness at their most relevant age groups
By sex 1955–60: by persons 1948–60

	Iritis iridocyclitis						Hypertensive retinopathy						Optic atrophy presumed or known as acquired								
Age group:	50–69			70 and over			50–69			70 and over			15–49			50–69			70 and over		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1948									0·78			5·05									
1949									0·91			5·18									
1950									0·94			5·47									
1951			1·18			3·62			1·10			6·14			0·48			1·07			2·89
1952			1·23			3·21			1·01			6·39			0·28			0·89			2·92
1953			1·15			3·48			1·18			7·87			0·33			0·92			3·45
1954			0·97			3·78			1·14			8·19			0·29			0·91			3·47
1955	0·83	1·08	0·97	2·40	4·06	3·42	1·06	0·95	1·00	7·13	5·21	5·95	0·87	0·46	0·66	1·90	1·03	1·42	5·68	3·86	4·56
1956	0·49	1·29	0·92	2·70	3·93	3·46	0·74	0·82	0·78	6·85	8·10	7·62	0·73	0·43	0·58	1·74	1·21	1·46	5·49	4·91	5·13
1957	0·72	1·19	0·97	2·27	3·82	3·24	1·06	1·13	1·10	8·16	9·14	8·77	0·77	0·40	0·58	1·98	1·02	1·47	5·97	3·97	4·72
1958	0·66	0·92	0·80	1·65	2·73	2·32	0·79	1·13	0·97	6·36	6·93	6·71	0·66	0·44	0·55	1·33	0·94	1·12	6·21	4·66	5·24
1959	0·44	1·08	0·78	2·11	3·38	2·90	0·80	0·76	0·78	7·76	6·49	6·96	0·67	0·44	0·55	1·71	1·19	1·43	7·45	4·68	5·71
1960	0·49	0·84	0·68	2·24	3·30	2·91	0·78	1·08	0·94	6·97	7·52	7·32	0·60	0·51	0·56	1·24	1·06	1·14	6·43	4·53	5·23
1961													0·66	0·41	0·53						
1962													0·78	0·56	0·67						

	Congenital defects						Retinitis pigmentosa and allied conditions (including macular dystrophy)					
Age group:	0–14			15–49			15–49			50–59		
	M	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1948			1·63			0·74			0·46*			0·67*
1949			1·72			0·74			0·63*			1·35*
1950			2·06			0·71			0·45*			0·98*
1951			1·99			0·83			0·56			1·05
1952			1·84			0·50			0·56			1·07
1953			1·70			0·41			0·59			0·79
1954			1·83			0·54			0·43			1·01
1955	0·99	0·83	0·91	0·29	0·34	0·31	0·54	0·16	0·35	0·48	0·76	0·63
1956	1·69	0·98	1·34	0·45	0·47	0·46	0·56	0·38	0·47	0·54	0·59	0·57
1957	1·54	1·05	1·30	0·31	0·28	0·29	0·46	0·20	0·33	0·82	0·78	0·80
1958	1·51	0·95	1·23	0·45	0·29	0·37	0·40	0·32	0·36	0·42	0·64	0·53
1959	1·56	0·96	1·27	0·55	0·26	0·40	0·44	0·26	0·35	0·82	0·35	0·57
1960	1·39	0·95	1·18	0·48	0·22	0·35	0·49	0·24	0·36	0·91	0·88	0·89
1961	1·17	0·91	1·04	0·33	0·28	0·30	0·56	0·28	0·42	0·93	0·81	0·87
1962	1·32	1·06	1·20	0·51	0·33	0·42	0·42	0·38	0·41	0·79	0·84	0·82

* All abiotrophic defects.

Cataract. There has been a marked decrease over the years. In the age group 60-69, the rate per 100,000 was 11·6 in 1948 and declined steadily to 7·85 in 1954, with a further decline to 5·35 per 100,000 in 1960. The decline was almost as definite for the age group 70 years and over, the rate per 100,000 falling steadily from 82·6 in 1949 to 57·6 in 1960 (the rate for 1948 was unusually low).

'Senile' macular lesions. The marked increase in the number of registrations as blind from senile macular lesions is seen to be largely an aspect of an increase in the general population in the age group 60-69 years. It is likely that the markedly increased rate for the age groups over 70 is to some extent a matter of an increasing proportion of the very aged in this composite age group.

Glaucoma. There has been a progressive decrease at 60-69 years and a less definite decrease at the higher ages.

Myopic chorioretinal atrophy. The rates in recent years have shown a substantial decrease from those seen in the earlier years for both the age groups of 30-49 and 50-59 years, but since 1955 the rates have been fairly stationary. At 60-69 there has been little change over the years and at 70 years and over there has probably been some increase.

Diabetic retinopathy. At 50-59 years there has been a steady increase in the rates over the years. At 60-69 and at 70 years and over, the marked increase has been confined to the years 1948-54. Since 1954, the rates for diabetic retinopathy have been steady for all ages over 60, and were rising only questionably for the younger age group.

Rates per 100,000 in the appropriate age groups for the remaining five conditions do not have quite the same validity as the rates just considered. The diagnoses involved are not quite so definite, and this, together with the change in classification adopted in 1955, make comparison year by year less certain. For the first of these five conditions—iritis and iridocyclitis—the earlier records (for the years 1948-50) tend to be somewhat confused as the distinction made subsequently between purely anatomical and purely aetiological diagnoses was not observed; furthermore, the differentiation from choroiditis—which figured prominently earlier on—was not always noted. Similarly, hypertensive retinopathy does not quite mean now what it meant some 15 years ago. The older classifications of the congenital defects and of the retinitis pigmentosa group, and particularly of the optic atrophies, are likewise open to various objections. It is safe enough to compare the years after 1954, but comparison with the earlier years are somewhat uncertain. With these reservations the following conclusions are warranted.

Iritis and iridocyclitis. There is a definite decline during 1958-60 as compared with 1955-57 (and the earlier years). This decline is seen at the ages studied, i.e., those with the substantial number of cases.

Hypertensive retinopathy. No clear pattern emerges, though a reduction in incidence could have been expected.

Optic atrophy, the congenital defects, and the retinitis pigmentosa group. No substantial changes are apparent in the age groups studied.

Sex differences.

The adjusted material in Table 27 allows a fine assessment of the sex difference in some of the major causes of blindness in their relevant age groups for the years since 1955. The more substantial differences were:

(1) A particularly marked female excess for diabetic retinopathy at the ages over 50, and a similar, though less marked trend, for myopia and for iridocyclitis. Cataract also shows a distinct female excess.

(2) A male excess was observed for glaucoma, optic atrophy, the congenital defects, and possibly also retinitis pigmentosa and allied conditions.

These findings agree closely with those recorded in Table 10.

The causes of blindness at different phases of life

The causes of blindness in the formative and active years of life differ markedly from those seen in senescence, and to a lesser extent from those seen in the intervening period. In the present context, the age groups up to 50 years may be considered in the first category, those over 70 years in the second category, and the age group 50-69 years in the third.

It has been seen in Table 20 that in the early part of the period under review the number of newly registered blind under the age of 50 was of the order of 1,200. This has declined steadily to about 800 in recent years, or some 7 or 8 per cent of all new registrations. For the age group 50-69 years there has been a less definite decline over the past fifteen years, the numbers falling from around 2,700 per year in the early 'fifties to about 2,300 recently—about 20 per cent of cases. The bulk of the new registrations come in the age groups over 70 years, and these new registrations have increased from about 7,000 annually to about 8,000.

The Blind under Fifty

This group is all important if only because in expectation of life they surpass the tenfold number of blind aged 70 and over. Though small numerically, these blind present considerable complexities in aetiology.

Table 28, based on Table 9, sets out the causes of blindness responsible for more than 2·0 per cent of cases in the different age groups under 50 for the years 1955-62. The data for the earlier years are not strictly comparable with the data since 1955 and are used in this discussion with some reserve. It will be seen

TABLE 28

Causes of blindness responsible for more than 2 per cent of cases in the age groups under 50
1955–62

Age group (years):	0–4	5–14	15–29	30–49
Congentital defects including retinal aplasia	63·1	49·8	24·0	9·4
Retrolental fibroplasia	14·9	4·8		
Retinoblastoma	4·4	2·2		
Optic atrophy, presumed acquired	10·5	21·6	23·9	18·7
Abiotrophic defects		5·9	15·2	12·8
Diabetes			4·9	11·2
Iritis and iridocyclitis		2·5	4·1	5·3
Myopic chorioretinal atrophy		2·9	5·2	11·3
Detachment:				
Myopic		1·3	1·3	2·2
Unspecified		1·0 2·3	2·0 3·3	2·9 5·1
Trauma			4·4	2·0
Glaucoma				3·3
Unspecified corneal lesions				2·8
All other causes	7·1	8·0	15·0	18·1
	100·0	100·0	100·0	100·0

that relatively few affections, or groups of affections, come into question, two being outstanding: congenital defects and optic atrophy presumed or known to be acquired. During 1955-62 the congenital defects showed a declining proportion with increase in age, falling from some 65 per cent at 0-4 years to some 10 per cent at 30-49 years, whilst acquired optic atrophy contributes some 20 per cent of all cases in the different age groups from 5 to 50 years.

Both these groups are highly complex. The congenital defects arise from a heterogeneous mass of genetic and environmental causes, whilst acquired optic atrophy is largely of undetermined origin. Both groups have a surgical aspect, for the congenital defects include such affections as cataract and buphthalmos, whilst the largest established cause of acquired optic atrophy is intracranial tumour. None the less the mass of cases are not amenable to treatment—surgical or medical—and are largely problems in aetiology.

Of the numerically lesser causes, the more significant are retrolental fibroplasia at 0-4 years, the abiotrophic lesions and myopic chorioretinal atrophy which become substantial after the age of 15, and diabetes which contributes more than 10 per cent of the total of new cases at 30-49 years. In addition there is trauma which contributes as much as 4·4 per cent at 15 to 29 years and 2·0 per cent of the larger total of cases at 30 to 49 years.

Some of these individual affections call for further consideration.

1. *Retrolental fibroplasia.*

The calamity of retrolental fibroplasia has been the outstanding influence on the trends in blindness in childhood during the past fifteen years. Statistical data on the affection are available since 1951 and are summarized in Table 29.

TABLE 29

Retrolental Fibroplasia

New registrations: 1951–62[a]

	Age at Examination (years)													
	0–1		1–2		2–3		3–4		4–5		0–5		Over 5	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1951	18	13	5	7	2	3	1	—	—	—	26	23	Not known	
1952	15	10	10	11	4	8	—	1	1	—	30	30	Not known	
1953	15	13	9	3	2	6	3	1	2	—	31	23	Not known	
1954	7	13	3	4	2	4	3	3	1	3	16	27	Not known	
1955	7	3	3	12	4	2	2	4	3	2	19	23	1	—
1956	11	2	9	3	1	2	4	3	2	4	27	14	—	6
1957	3	3	1	3	3	—	—	2	—	1	7	9	1	2
1958	2	1	—	1	—	1	—	2	—	1	2	6	3	3
1959	5	3	1	—	—	3	—	—	—	—	6	6	2	3
1960	—	1	1	2	1	2	—	—	1	1	3	6	2	—
1961	2	1	2	—	—	—	—	—	—	—	4	1	1	4
1962	—	1	—	2	2	—	—	1	—	2	2	6	1	1
1951–53	48	36	24	21	8	17	4	2	3	—	87	76		
1954–56	25	18	15	19	7	8	9	10	6	9	62	64		
1957–59	10	7	2	4	3	4	—	4	—	2	15	21		
1960–62	2	3	3	4	3	2	—	1	1	3	9	13		
1951–62	85	64	44	48	21	31	13	17	10	14	173	174		

[a] Wales and the West Country not included till April 1955 and January 1955 respectively.

It will be seen that the year 1954 was a turning point. In that year the new registrations under the age of 1 fell to 20—they had been 31, 25 and 28 in the three preceding years—and there has been a steady decline since then, falling to 3 in 1961 and to 1 in 1962.

Retrolental fibroplasia figures heavily in the new entries at the Sunshine Homes during 1951 to 1959 (Table 21 in Sorsby, 1956, and Table 17 above). During these nine years the total of admissions from this affection was 308, whilst during the three years 1960-62 the total was 30: the average annual admissions for these two periods had therefore declined from 34 to 10. The returns from the Sunshine Homes, where the average age tends to be 2 or 3 years, show the years 1953 to 1957 as the highest with an average of 41 per year, and there has been a steady decline since. This confirms the findings in the certificates of blindness that 1954 was indeed the turning point.

The repercussion on older children can be seen best by the growth of the blind population of school age recorded in Table 19. The peak was reached around 1959. This agrees with the height of the affection having been reached five years earlier. As a whole, the figures show three trends: (1) between 1948 and 1952 the numbers and rates per 100,000 remained stationary—repeating very much the pattern that had been recorded since about 1942; (2) between 1953 to 1958 there was a sharp increase reflecting an increasing influx of children with retrolental fibroplasia; (3) this increase was halted by 1959, and before long a decline should set in, though it will not be until about 1970 that numbers of the order seen in the 'forties will begin to appear again.

2. *Congenital defects.*

Few of the congenital defects are exclusively genetic or environmental in origin. Congenital cataract and congenital optic atrophy—the two major entities—can be either genetic or environmental in character. Buphthalmos, microphthalmos, nystagmus and various anomalies of the fundus, or of the globe as a whole, are not always easily established on an aetiological basis. Retinoblastoma illustrates the same difficulty, and even retinal aplasia—a clear genetic affection—has many mimics of environmental origin, including rubella retinitis. Clearly established genetic affections like retinitis pigmentosa and the macular dystrophies are relatively few. All this uncertainty as to aetiology makes any assessment of trends difficult.

In present-day classifications, the congenital defects are largely a topographical group. As can be seen from Table B in the appendix, the actual anatomical lesions recorded for the globe as a whole cover such affections as nystagmus, albinism, anophthalmos, buphthalmos, microphthalmos, aniridia, colobomata and various multiple defects. The more limited defects include such disorders as congenital cataract, retinal aplasia and congenital optic atrophy. As already noted, the commonest individual anomalies are cataract and optic atrophy.

These anatomical diagnoses have no clear counterpart in the aetiological diagnoses recorded in Table A of the appendix, for the affections recorded as due to pre-natal influences include such postnatal disorders as interstitial keratitis and the abiotrophies. When no sharp demarcation is made between the congenital and the postnatal disorders that are determined before birth, an aetiological pattern emerges. In all, there were 3,122 cases (at all ages during 1955-60) due to prenatal influences, and the two factors that stood out were hereditary influences and congenital syphilis. Genetic factors were present in 775 and assumed in a further 658—mostly in cases of abiotrophic disorders—and congenital syphilis was recorded in 314 cases (of which 273 were cases of interstitial keratitis), mainly amongst the older patients for congenital syphilis is a rapidly disappearing cause and is now seen only exceptionally in the younger age groups. Aetiological diagnoses in the definitely congenital defects were quite exceptional: 18 cases were recorded as due to rubella and 2 cases as due to toxoplasmosis. Congenital anomalies, whether of the globe as a whole or of individual tissues like the lens or optic nerve, are but rarely established aetiologically in the blind certificates, and not more often in clinical practice.

3. *Optic atrophy.*

Data on the groups of causes of optic atrophy in the age groups under 50 are available for the years 1956-62 and are shown in Table 30.

TABLE 30

Optic atrophy by aetiology in the age groups under 50
1956–62

	1956			1957			1958			1959			1960			1961			1962			1956–62					
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.		F.		P.	
																						No.	%	No.	%	No.	%
Intracranial tumours ...	21	24	45	25	10	35	27	19	46	20	21	41	16	18	34	23	19	42	22	20	42	154	20·2	131	25·5	285	22·3
Prenatal influences	42	22	64	34	19	53	25	17	42	31	16	47	25	14	39	36	20	56	27	23	50	220	28·8	131	25·5	351	27·5
Multiple sclerosis	15	7	22	10	10	20	5	10	15	8	8	16	12	16	28	16	11	27	14	14	28	80	10·5	76	14·8	156	12·2
Other specified affections ...	23	9	32	22	15	37	19	11	30	14	10	24	12	8	20	12	11	23	19	16	35	121	15·8	80	15·6	201	15·7
Undetermined	26	10	36	33	12	45	27	17	44	29	18	47	29	16	45	21	12	33	24	11	35	189	24·7	96	18·6	285	22·3
	127	72	199	124	66	190	103	74	177	102	73	175	94	72	166	108	73	181	106	84	190	764	100·0	514	100·0	1,278	100·0

It will be seen that the optic atrophy is determined by prenatal causes in 27·5 per cent of cases, most of the rest being ascribed to acquired affections. Intracranial tumours were responsible for over 20 per cent and neurological disorders for some 12 per cent. Various other general disorders accounted for some 15 per cent and in a final 20 per cent no cause could be established. The optic atrophies determined by prenatal influences showed a striking sex difference—consistent with the known excess of congenital defects in males. It is likely that a good proportion of optic atrophy of undetermined origin belongs to this group, for here, too, there is a marked male excess.

Amongst the prenatal influences prematurity has figured occasionally as a cause of congenital optic atrophy. Its exact significance remains to be assessed.

Some indication of the various individual causes—as distinct from the groups shown in Table 30—is available for optic atrophy as seen at all ages for 1955-60 and is recorded in Table 31. It can be seen that in optic atrophy determined by

TABLE 31

Optic atrophy: by aetiology: all ages : 1955–60

Tumours:	
Intracranial	404
Adnexa, metastatic and site undetermined (1)	19
Vascular diseases:	344
Prenatal influences:	
Genetic, established or presumed	66
"Congenital" (2)	258
Congenital syphilis	12
Neurological disorders:	
Multiple sclerosis	169
Other affections (3)	58
Other systemic disorders:	
Syphilis, acquired	79
Tuberculosis	34
Other specified affections (4)	104
All trauma:	65
Undetermined:	1,191
	2,803

(1) Recorded for 1958–60 only.
(2) During 1955–1958 a distinction was made between congenital optic atrophy as an isolated lesion and optic atrophy as part of a syndrome. The 186 cases recorded during these years were distributed at 98 and 88 for the two groups respectively.
(3) Not recorded for 1955.
(4) Including meningococcal meningitis which gave 3 cases in 1958 and 2 in 1959 and 8 cases due to anaemia and blood diseases and 6 cases due to 'poisonings'. (The sub-groups anaemia and blood diseases, and poisonings were used since 1958. For the years 1958, 1959 and 1960 there were respectively 3, 3 and 2 cases for the first group and there were 3 cases in 1959 and 1960 for the second group.)

prenatal influences, a clear genetic background is present in only some 20 per cent of cases, and that vascular disease—obviously developed after the age of 50—is highly important. Congenital syphilis is not a very significant factor, and the mass of congenital optic atrophy—like the mass of other congenital lesions —presents an aetiological puzzle. Amongst neurological disorders multiple sclerosis is outstanding only after the age of 50. Of the different systemic disorders, tuberculosis is a relatively new cause and represents mainly recovered cases of tuberculous meningitis. Optic atrophy from trauma is generally the result of falls and transport injuries. The largest individual cause of optic atrophy is intracranial tumour. The high proportion of optic atrophy of undetermined origin is as striking a feature for all ages as it is in the age groups under 50.

4. *The abiotrophic affections and myopic chorioretinal atrophy.*

The abiotrophies become significant after school life, whilst myopic chorioretinal atrophy—which must be regarded as an abiotrophic process—assumes significant proportions towards middle life. Amongst the abiotrophies, retinitis pigmentosa and the macular dystrophies are outstanding; progressive choroidal atrophy (choroideremia), the corneal dystrophies, and various ill-defined genetic disorders all contribute their quota. Chorioretinal atrophy is not the only lesion of myopia, for a proportion of the retinal detachments—rather less than half of the total—are recorded as myopic in origin: many of the myopes registered as blind have ocular anomalies other than myopia and, particularly in the younger age groups, progressive myopia with degenerative changes in the fundus is less significant than the other defects present, for frequently there are also corneal changes, lens haze and ill-defined fundus anomalies not characteristic of myopia; the myopia is in fact symptomatic of a more widespread disorder. In children, such myopia is often not progressive, though amblyopia may be severe, and it is often a moot point whether these cases should be classified as showing a congenital defect rather than myopia. A clearer conception of these affections—which are grouped together because of the refractive state they have in common—is needed.

The number of cases of myopic chorioretinal atrophy at 30-49 years is sufficiently large to warrant assessment of rates per 100,000. It will be seen from Table 27 that this rate was fairly stationary at around 0·45 in 1956-62, but that there was a higher rate in the previous years. As this pattern is also repeated at 50-59 years, but not at the higher age groups (which show a fairly stationary rate) it is likely that fewer young and middle aged myopes come to registration today, possibly because of the availability of contact lenses and other optical aids. The underlying problem is itself unlikely to have diminished.

The significance of the abiotrophies and myopia is strikingly brought out by the fact that the two affections together account for over 25 per cent of all cases during the most active years of life—at 30-49 years.

5. *Diabetes.*

Retinopathy is almost exclusively the cause of blindness in diabetes in the certificates analysed. The globe as a whole is affected only occasionally and diabetic iritis does not figure at all in the certificates. Diabetes emerges with almost 5·0 per cent of cases at 15-29 years, but accounts for more than double that incidence in the age group of 30-49 years. A striking feature is a heavy male excess in numbers at both these age groups, not statistically significant at 15-29 years, but markedly significant at 30-49 years. Though a lesser cause of blindness at all ages up to 50, the incidence at 30-49 years is as high at 11.2 per cent of all cases.

6. *Trauma.*

During 1955-62 trauma shows its highest proportionate incidence at 15-29 years, when it was responsible for 4·4 per cent of cases. Actually (as can be seen from Table 9) all but 7 of the 45 cases were males, giving a proportionate incidence of 6·1 per cent in males against 1·8 in females. At 30-39 years the total number had risen to 69, with the sex difference still more accentuated: 8 women against 61 men.

The burden of trauma is higher than is suggested by these figures. In the first place, there is the considerable incidence of trauma as a cause of blindness limited to one eye. Such patients do not come to notice unless they become affected in the other eye, generally by cataract or 'senile' macular lesions late in life.

A numerically less significant cause, but important because of its disastrous character, is sympathetic opthalmia (Table 16). Most cases arise late in life following cataract operation, but of the total of 155 cases of sympathetic ophthalmia during 1955-60, 58 followed non-surgical trauma, and of these 25 were individuals under the age of 50, blinded by various types of injury.

7. *Other causes.*

(1) *Retinoblastoma.* This is a substantial cause only in children (4·4 per cent of cases at 0-4 years and 2·2 per cent of cases at 5-14).

(2) *Retinal detachment.* This figures with small numbers in the different age groups. Detachment is responsible for 5·1 per cent of all cases at 30-49 years if both the myopic and non-myopic types are considered together.

(3) *Iritis.* This is significant even at 5-14 years, contributing 2·5 per cent of cases. At 15-29 years the proportion is 4·1 per cent and at 30-49 years it rises to 5·3 per cent.

The Blind at 50-69 *years*

This group, which contributes some 2,500 cases each year, is considerably more homogeneous aetiologically than the numerically much smaller group aged under 50.

It has been seen in Table 9 that in recent years myopic chorioretinal atrophy and diabetes are the leading causes at 50-69 years; myopia was responsible for 18·1 per cent of all cases at 50-59 and for 16·1 per cent at 60-69 years, and diabetes for 15·6 and 17·1 per cent in these two age groups respectively. The two affections therefore accounted for some 33 per cent of all cases at these ages, The following observations are relevant.

1. *Myopic chorioretinal atrophy.*

It has been pointed out that at 50-59 years this affection has shown some decline in the rate per 100,000 in recent years (Table 27), parallel to a similar decline at 30-49 years. Presumably, at this age too, modern aids may have kept down the numbers seeking registration. As already noted no such decline is, however, recorded for the age group 60-69 years, nor for the higher ages.

2. *Diabetes.*

This rises from the second place at 50-59 to the first at 60-69 years. Particularly noteworthy is the sharp increase in the rate per 100,000 at 60-69 compared with that at 50-59 years. The sex differences are also particularly striking—the female excess rising to almost three times at 60-69 years. This female excess which is also seen in the highest age group is in sharp contrast to the male excess for diabetes under 50.

3. *Other affections.*

Apart from these two major causes, the age group 50-69 years shows optic atrophy, glaucoma, cataract and the 'senile' macular lesions as substantial causes; there is also some overlap of the major affections seen under the age of fifty—the abiotrophic affections, iritis and iridocyclitis, and retinal detachment. A new factor emerges with hypertensive retinopathy, responsible for 3·1 per cent at 50-59 and 4·5 per cent at 60-69 years.

It is noteworthy that at 50-59 years substantially less than 25 per cent of all cases are represented by the major surgical affections—cataract, glaucoma and retinal detachment—and that even at 60-69 years this percentage is only slightly more than 30.

The Blind at 70 years and over

In this, the numerically preponderant group—giving some 8,000 new registrations in recent years—the causes of blindness seen are relatively few. Three affections—'senile' macular lesions, cataract and glaucoma—are responsible for over 75 per cent of cases (77·7 per cent of all cases during 1955-60, 78·7 per cent in 1951-54 and 79·8 per cent in 1948-50). The following observations are relevant.

1. *'Senile' macular degeneration.*

It has been seen from Table 26 that there has been a two-fold increase in numbers between 1949 and 1962, and it is clear from Table 27 that there has in fact been an almost parallel increase in the rates per 100,000 at 70 years and over. It is unlikely that this represents a doubling of the frequency of the affection,

if only because there is no such increase at 60-69 years. It is likely that the increase recorded reflects the considerably larger number of the very aged included in the group of 70 years and over. It is also possible that there is a greater readiness to certify as blind borderline cases amongst those of advanced age.

The aetiology of 'senile' macular lesions is obscure. It is, however, clear that the emphasis on senility as the cause is unfortunate. These lesions affect only a very small minority of the aged, and whilst the designation of senile adds nothing to the understanding of the lesion, it does much to confuse the issue in stressing an aspect which may well not be relevant in the pathology of the affection.

2. '*Senile*' *cataract.*

It has already been seen that the number of persons certified as blind from 'senile' cataract has declined from, 3,000 per annum in the early fifties to about 2,300 in recent years—and a very similar decline is shown in the rates per 100,000 at 70 years and over (Tables 26 and 27). This gratifying improvement—probably even more real than these figures suggest, because of the great increase in the number of extremely aged in recent years—is perhaps the most striking feature in recent blind statistics.

The criticism of the appellation of senile to macular lesions seen in the elderly applies equally to cataract. Here, too, an affection of unknown origin is burdened with a useless and possibly misleading label.

3. *Glaucoma.*

It has been seen in Table 26 that in total numbers glaucoma appears to have remained stationary over the past fifteen years. This is also seen from the rates per 100,000 at 70 years and over (Table 27)—a striking contrast to the decline recorded for the age group of 60–69.

4. *Other affections*

Myopic chorioretinal atrophy, diabetic retinopathy and hypertensive retinopathy are the lesser causes at this age group. The one definite trend observed has been in diabetic retinopathy which showed an increase during 1948 to 1954 since when it has remained relatively stationary.

Of the three 'senile' affections, macular lesions have therefore shown an increase at this age group, glaucoma has remained stationary, and cataract has declined markedly.

BLINDNESS FROM A DIFFERENT CAUSE IN EACH EYE

The proportion of certificates recording a different cause of blindness in the two eyes was very much the same in the three periods studied. In 1948–50 it was 7·7 per cent; in 1951–54 it was also 7·7 per cent, and it was 6·2 per cent in 1955–60.

As can be seen from Table 32, the distribution of causes of blindness likewise showed no substantial differences over these three periods, except for trauma, which declined in significance. In the first period nearly half the individuals had lost one eye from trauma, and this proportion fell to some 40 per cent in

TABLE 32

Blindness from a different cause in each eye.
1948–60

Percentage distribution of causes responsible for more than 5 per cent of cases in each of the three periods shown
Each eye listed separately

Period	1948–50	1951–54	1955–60
Total number of eyes	3,046	5,168	7,712
All Trauma (including sympathetic ophthalmia)	24·9	19·9	17·8
Cataract	24·7	23·7	22·8
Glaucoma	10·7	12·1	10·9
Senile macular lesions	6·1	7·7	10·2
Hypertensive and vascular disorders	5·1	7·4	9·2
All other causes	28·5	29·2	29·1
	100·0	100·0	100·0

the second period and to some 30 per cent in the third period.

One point of interest is the incidence of *amblyopia ex anopsia*. This was not a significant factor; it contributed some 3 per cent of blinded eyes throughout the years, the actual distribution being 3·3, 3·4 and 3·5 per cent for the three periods respectively. A more significant factor was sympathetic ophthalmia.

Sympathetic ophthalmia

The causes of sympathetic ophthalmia are shown in Table 33. It will be seen that of a total of 389 cases during 1948–60, cataract operations accounted for 194, considerably more than all forms of trauma, whilst glaucoma with 37 cases was responsible for only slightly less than industrial trauma. These 389 cases were unevenly distributed over this period: there were 120, 114 and 155 over the years 1948–50, 1951–54 and 1955–60, when the total number of certificates analysed were respectively 19,673, 33,379 and 62,128, giving a percentage distribution of 0·60, 0·34 and 0·25—a striking decline over the years.

TABLE 33

Sympathetic ophthalmia: exciting causes
1948–60

	Cataract		Glaucoma		Trauma								All other causes		Total		
					Industrial		Military		Non-industrial		Unspecified						
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	P.
Year																	
1948	5	4	1	—	5	—	2	—	5	2	1	1	—	—	19	7	26
1949	6	18	—	2	9	1	2	1	7	—	2	—	—	—	26	22	48
1950	9	11	5	2	5	—	—	—	12	1	—	—	1	—	32	14	46
1951	6	7	—	—	4	1	1	—	6	3	—	—	—	—	17	11	28
1952	7	5	2	1	2	—	—	—	4	2	—	—	—	—	15	8	23
1953	4	15	—	4	2	—	1	—	6	2	—	—	—	1	13	22	36**
1954	3	17	1	3	—	—	—	—	2	1	—	—	—	—	6	21	27
1955	6	13	2	2	2	—	—	—	3	—	2	3	—	—	15	18	33
1956	6*	6	1	5	3	—	1	—	6	2	3	—	1	—	21	13	34
1957	2	10	—	1	1	—	1	—	3	1	—	1	—	—	7	13	20
1958	2	6	1	2	5	—	—	1	5	2	—	—	1	—	14	11	25
1959	5	9	—	—	3	1	—	—	1	1	—	1	1	1	10	13	23
1960	4	7	1	1	1	—	—	1	1	2	1	—	1	—	9	11	20
	65	128	14	23	42	3	8	3	61	19	9	6	5	2	204	184	389**

* Including 2 cases of dislocated lens in elderly patients.
** Including 1 case due to cataract in 1953 in a person of sex not stated.

Cataract contributed 53, 65 and 76 cases in these three periods respectively. From a sample survey conducted by the Ministry of Health on hospital in-patients in 1958 it would appear that some 24,000 cataract operations were performed in that year in hospitals in England and Wales. Assuming that this figure applies to each of the years under survey, there would have been some 72,000 operations in 1948–50, some 96,000 in 1951–54 and some 144,000 in 1955–60. On this basis the incidence of sympathetic ophthalmia was 0·73 per 1,000 operations in 1948–50, 0·67 in 1951–54 and 0·52 in 1955–60. It is likely that the actual incidence was considerably more than 0·73 in 1948–50, for the certificates analysed fell far short of the total issued during these years, and, moreover, there were probably fewer cataract operations at that time.

Glaucoma was responsible for 10, 11 and 16 cases in the three periods respectively. The number of glaucoma operations, computed on the same basis as for cataract, was of the order of 11,000 per year. The rates per 1,000 operations for each of the three periods would therefore be of the order of 0·30, 0·25 and 0·24. Of the 37 cases during this period, 28 were concentrated in 1950–56—the years in which iridencleisis was widely practised.

It is difficult to determine whether there has been any decline in sympathetic ophthalmia from non-surgical trauma for there are no data on the frequency of injuries that may lead to this complication.

The overall figures for 1948–62 bring out strikingly the marked sex differences observed in trauma as a cause of sympathetic ophthalmia. For non-industrial trauma there were 61 men against 19 women, and for industrial trauma 42 men against 3 women.

4. SOME SPECIAL ASPECTS

DATA ON WALES

Incidence of blindness

Table 34 shows the basic data on the number of blind in Wales, 1948–62.

TABLE 34

Wales and Monmouthshire: The Registered Blind and the New Registrations: 1948–62

Year	The Registered Blind: all ages (1)			New Registrations: all ages (2)			New Registrations at 70 years and over			
	M.	F.	P.	M.	F.	P.	M.	F.	P.	% P.
1948	2,710	2,933	5,643	307	361	668	175	215	390	58·4
1949	2,787	3,113	5,900	394	518	912	232	341	573	62·8
1950	2,898	3,286	6,184	423	514	937	276	373	649	69·3
1951	2,994	3,436	6,430	383	511	894	256	349	605	67·7
1952	3,095	3,584	6,679	312(3)	425(3)	737(3)	205	292	497	67·4
1953	3,131	3,675	6,806	395	518	913	272	360	632	69.2
1954	3,215	3,824	7,039	437	539	976	310	389	699	71·6
1955	3,196	3,913	7,109	398	570	968	282	411	693	71·6
1956	3,213	4,008	7,221	407	555	962	293	407	700	72·8
1957	3,178	4,190	7,368	356	581	937	258	426	684	73·0
1958	3,076	4,151	7,227	301	519	820	202	386	588	71·7
1959	3,049	4,224	7,273	373	606	979	259	469	728	74·5
1960	3,025	4,306	7,331	364	615	979	264	465	729	74·5
1961	2,954	4,357	7,311	312	596	908	211	457	668	73.6
1962	2,940	4,335	7,275	374	515	889	253	380	633	71·2

(1) For 1948-51 the registered blind population is as shown on March 31st the following year. For the subsequent years it is as December 31st.

(2) The years 1948-51 represent the years ending March 31st 1949-52; 1952 represents nine months only—April to December; 1953-62 are calendar years.

(3) Nine months only: April to December.

It will be seen that the numbers on the Blind Register showed very much the same trends as for the country as a whole. There was a substantial increase during 1948 to 1954, and since then the number has been fairly stable at around 7,200. Likewise the number of new registrations each year has followed the same pattern. In one respect the data for Wales showed some difference from those for the country as a whole: the proportion of those aged 70 years and over amongst the newly registered has been consistently somewhat higher.

Causes of blindness

In the absence of tables showing the causes of blindness in Wales by age groups, only some general conclusions can be reached. Table 35 sets out the

TABLE 35

Causes of blindness responsible for more than 1 per cent of cases in Wales and Monmouthshire: numbers and percentage distribution with comparable percentage distribution for England.

1955–60

	WALES AND MONMOUTHSHIRE						ENGLAND		
	Numbers			Percentage			Percentage		
	M.	F.	P.	M.	F.	P.	M.	F.	P.
Congenital defects:									
Cataract	23	20	43						
Optic atrophy	14	2	16						
Other structural defects including nystagmus	20	21	41						
	— 57	— 43	— 100	2·9	1·4	2·0	4·3	1·8	2·7
Retinitis pigmentosa and allied conditions (including macular dystrophy)	31	27	58	1·6	0·9	1·2	3·0	1·4	2·0
Retinal detachment									
Myopic	12	8	20						
Unspecified	10	11	21						
	— 22	— 19	— 41	1·1	0·6	0·8	1·8	0·7	1·1
Myopic chorioretinal atrophy	121	239	360	6·3	7·6	7·1	7·4	9·1	8·5
Glaucoma	248	304	552	12·9	9·7	10·9	14·7	11·6	12·8
Cataract 'senile'	562	1,037	1,599	29·2	33·1	31·6	17·3	24·3	21·7
'Senile macular lesions'	531	859	1,390	27·6	27·4	27·5	26·6	27·0	26·9
Diabetic retinopathy	25	224	249	1·3	7·2	4·9	4·7	8·7	7·3
Hypertensive and vascular retinopathy	66	77	143	3·4	2·5	2·8	3·4	3·1	3·2
Iritis and iridocyclitis of undetermined origin	29	53	82	1·5	1·7	1·6	1·9	2·3	2·1
Optic atrophy, known or presumed acquired	110	81	191	5·7	2·6	3·8	6·2	3·2	4·3
Corneal lesions unspecified	27	47	74	1·4	1·5	1·5	2·0	2·1	2·1
All other causes	98	120	218	5·1	3·8	4·3	6·7	4·7	5·3
	1,927	3,130	5,057	100·0	100·0	100·0	100·0	100·0	100·0

causes responsible for more than 1 per cent of cases for Wales and Monmouthshire contrasted to the corresponding data for England (only). There was a somewhat higher proportion of cases of 'senile' macular lesions but a markedly higher proportion of cataract cases (31·6 per cent of cases for Wales as against 21·7 per cent for England). Whether in fact more cataract patients in Wales do not seek operation, or are unsuitable for surgical treatment, or have difficulty in obtaining it, cannot be determined on the available evidence. There does not seem to be any substantial difference in the incidence of the other causes of blindness as between Wales and England if allowance is made for the higher proportion of cataract cases shown by the analysis.

The Jewish Blind Society has on its books those of the registered blind (and a very occasional person not registered) who seek its help. At present (September, 1964) there are 933 blind and 467 partially sighted. As the Jewish population in England and Wales is of the order of 1 per cent, there should be some 1,000 registered blind amongst them. A sample assessment was undertaken by obtaining the certificates of registration of 142 persons on the books of the Jewish Blind Society having London and Middlesex addresses and registered as blind between 1951 and 1960.

Table 36 gives an analysis of the data in these 142 certificates, classified by

TABLE 36

The causes of blindness in 142 Jewish blind registered during 1951–60

Age group (years):	0–49			50–69			70 and over			All ages		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
Congenital defects	4*	4	8	—	—	—	—	—	—	4	4	8
Retinitis pigmentosa and allied affections	2	4	6	2	—	2	1	—	1	5	4	9
Retrolental fibroplasia	—	2	2	—	—	—	—	—	—	—	2	2
Retinoblastoma	—	1	1	—	—	—	—	—	—	—	1	1
Myopic chorioretinal atrophy	5	5	10	4	14	18	2	3	5	11	22	33
Glaucoma	1	—	1	1	3	4	6	3	9	8	6	14
Cataract	—	2	2	1	9	10	—	9	9	1	20	21
'Senile' macular lesions	—	—	—	—	—	—	2	2	4	2	2	4
Optic atrophy	6	1	7	2	2	4	—	—	—	8	3	11
Detachment of retina	—	1	1	1	—	1	1	—	1	2	1	3
Diabetic retinopathy	3	2	5	5	6	11	—	4	4	8	12	20
Iridocyclitis	3	—	3	—	2	2	—	—	—	3	2	5
Hypertensive and vascular lesions	—	—	—	2	—	2	—	—	—	2	—	2
Retinal lesions: ill-defined	—	—	—	–	3	3	—	—	—	—	3	3
Injury	1	—	1	—	—	—	—	—	—	1	—	1
Ill-defined	—	1	1	2	1	3	1	—	1	3	2	5
	25	23	48	20	40	60	13	21	34	58	84	142

* Including 2 cases of anophthalmos in unrelated patients.

causes in the age groups 0–49, 50–69 years and 70 years and over. It is clear that the sample is not representative of the Jewish blind population for there is a heavy deficiency of the older age groups. If all ages are considered there is a strikingly high proportion of blindness due to myopia—seen in 33 cases— and of diabetic retinopathy—seen in 20 cases. Assessed by age groups, this high incidence assumes a lesser significance: at 0–49 years there are 10 cases of myopia and 5 cases of diabetic retinopathy in a total of 48. This would suggest that there is a higher incidence of myopia and probably little difference in diabetic retinopathy in the Jewish blind compared with the blind in the general population during 1955–62 (Table 9). At 50–69 years a probable excess for myopia is again suggested, for there were 18 cases out of a total of 60. The comparable figures for the general population were 2,224 out of 13,202. Diabetic retinopathy with 11 cases suggests no substantial difference in incidence from that seen in the general population.

On this sparse evidence, a higher incidence of myopic chorioretinal atrophy is the one obvious difference between the Jewish and the general populations.

SECTION III

DISCUSSION

1. STATISTICAL AND AETIOLOGICAL CONSIDERATIONS

The validity of the available blind statistics

Since registration as blind is not obligatory, the validity of the available blind statistics depends not only on the efficiency of the machinery for registration, but on a tangle of ophthalmological and social factors.

When the Register was first established in 1919 it carried 25,840 names. The number rose steadily to 74,418 by March 1940, and but slightly during the rest of the decade: it stood at 78,579 at March 31st, 1949. There was a marked increase in the subsequent years reaching 90,019 in 1956, but in the following six years the increase was slight, the number being 96,729 in 1962.

New registrations, for which data are available only since the returns for the year ending March 1937, show a fairly similar trend. In 1937, the number was 7,897 and in the years till 1949 the numbers remained very much at this level. For the year ending March 1949 there were 8,624 new registrations, and that number rose steeply until 1954 when it reached 12,497. Since then the registrations, though remaining high, have not reached this level.

During the 'forties when both the blind population and the number of newly registered had shown but little change, it was widely believed that registration had become fully effective—a belief not borne out by the subsequent developments. The relatively stationary number of new registrations and of the blind population since 1957 may therefore also present a passing phase. Bearing on this possibility three factors call for consideration.

1. *The institution of the Register for the Partially Sighted.*

One development in recent years which might have been responsible for the end of the spurt in new registrations after 1954 was the inception of the Register of Partially Sighted. Data in the Annual Reports of the Chief Medical Officer of the Ministry of Health for 1957 to 1961 show that about 25 per cent of those registered are borderline cases, not far removed from the limits for certification as blind. There is, however, nothing to suggest that the registration of these partially sighted has materially influenced the numbers registered as blind, if only because the register was instituted in 1948—the very year when the spurt in registrations of the blind began. It will be seen from Table 37 that the annual

TABLE 37

The partially sighted population
1951–62

	Number newly registered	Number on register
1948	Not available	Not available
1949	,,	,,
1950	,,	,,
1951[1]		9,502
1952	3,051 [2]	11,226
1953	4,226	13,678
1954	4,809	15,922
1955	4,866	18,435
1956	4,906	20 329
1957	4,598	21,627
1958	4,406	22,372
1959	4,712	23,038
1960	4,869	24,239
1961	4,793	25,206
1962	5,021	26,097

(1) Year ending March 31st 1952. The subsequent years are calendar years.
(2) 9 months only, April—December.

number of new registrations as partially sighted has remained at between 4 and 5 thousand during 1952 to 1962 irrespective as to whether the number registered as blind either increased or remained stationary.

2. *The source of reference of the newly registered blind.*

For 1957–60 information on the source of reference of the newly registered blind is available on 32,509 cases of all ages (Table 38). Of these, 38·6 per cent

TABLE 38

Source of reference in 32,509 of the blind registered during 1957–60

Age group: (years)	0–49		50–69		70 and over		All known ages	
	No.	%	No.	%	No.	%	No.	%
Medical sources	1,353	58·4	3,187	46·5	8,008	34·3	12,548	38·6
Lay sources	962	41·6	3,666	53·5	15,333	65·7	19,961	61·4
	2,315	100.0	6,853	100·0	23,341	100.0	32,509	100·0

were referred by ophthalmologists or general practitioners, and 61·4 per cent by the National Assistance Board and other lay sources. There are no adequate comparable data for earlier years. A distinctly weighted sample — selected to show the differences between London and country areas—is available for 2,545 cases during 1951–54 (Sorsby, 1956). This gave 21·3 per cent referred by medical sources and 78·7 per cent by lay sources. A more satisfactory sample —2,540 cases out of approximately 6,000—is available from the records of the Southern Regional Association for the Blind for 9 months in 1956, and gave respective percentages of 39·7 and 60·3, i.e., proportions similar to those in the present study.

It can be seen from Table 38 that the highest proportion of reference by a medical source is in the younger age groups, which of course include children at blind schools and children below school age, for whom reference by other than a medical source is exceptional.

The high incidence of a lay source of reference for the higher age groups— the numerically overwhelming section of the blind population— makes blind statistics dependent on social rather than ophthalmological factors. The social factors are themselves highly complex, for of the 7 million people of pensionable age some one and a third million seek relief from the National Assistance Board, and it is in fact this Board which is the largest source of reference for blind registration. Each year some 6,000 people of pensionable age are referred from lay sources, and obviously this figure would be readily influenced by any change in the number of elderly applying to the National Assistance Board. If the proportion of blind amongst the elderly seeking financial help applies also to the elderly who do not seek such relief—and this is an unproved assumption—there would be a substantial number of elderly people of pensionable age who do not come to registration. Whether this is in fact true can only be verified by a field study. These considerations emphasize that we do not at present know how extensive the incidence of blindness is amongst the ageing, and we are unlikely to get even an approximately valid assessment of any such incidence until the elderly population seek the assistance of their general practitioners more readily than they do at present on visual problems. With registration exclusively from medical sources, there would still be the considerable uncertainty as to how representative the statistics would be, for registration as blind is largely determined by financial and social considerations. It is clear that for many years to come the number registered annually will continue to represent only a portion of a larger— and perhaps very much larger—number. Substantial changes in the number of the aged blind is an ever-present possibility, for the available evidence suggests that more of the elderly blind remain unregistered than come to registration.

3. *Administrative Measures*

In the long run the number of blind people who come forward for registration depends not only on the number of blind but also on the efficiency of the administrative machinery for registering them. This was strikingly seen in 1949, when a spurt in registrations followed on the issue of a circular to local authorities (Circular No. 87/48) requiring them to set up new schemes for blind welfare. The number of new registrations for the year ending March 31st, 1949 was 8,624; in the following year the number rose to 10,650, and it has remained at about that level since.

Trends in 1948–62

It has already been pointed out that the one group on which blind statistics are reasonably adequate is that of children of compulsory school age, whilst for infants under 5 years the data, though not complete, are probably fairly full. At the other age groups—even in those over 70 years, in whom the data are obviously incomplete—the statistics show a markedly consistent pattern, and it is therefore probable that the registrations as blind and the trends they show as to numbers and causes are representative. Taking the different age groups roughly by the adequacy of the data available, the following assessment becomes possible.

Blindness in Childhood

Though the figures for the children of school age are adequate, two reasons make it difficult to assess trends in the incidence of blindness. In the first place, the number of new registrations of school age are influenced by the number of registrations of blind children under school age, and of late there has been a considerable tendency to register blind babies early on, rather than to wait until they go to school. Secondly, the full significance of retrolental fibroplasia cannot be assessed statistically as data on retrolental fibroplasia began to be collected only in 1951, and the diagnoses even then may not have been as adequate as they were a few years later. It would therefore seem best to assess rates of blindness at 0–15 years rather than at school age and to carry these assessments back to the years before 1948 when retrolental fibroplasia was not a significant factor.

Table 39 gives the available data as far back as 1936. It will be seen that the year 1948 shows a sudden increase in the number and rate per 100,000 of new registrations at 0–15 years, rising rapidly to its peak in 1951 and declining since. By 1957 the incidence of blindness in childhood had returned to the order seen during 1936–47. As the new registrations since 1957 still carry some cases of retrolental fibroplasia (see Table 29) it is clear that if this group of cases are excluded there has been some decline in the incidence of blindness in childhood in recent years. It is also clear that the reduction has not been of any high order—a finding that bears out the repeated observations in the earlier studies, that the incidence of blindness in childhood was reaching bed-rock level, for the blinding affections seen today are very largely congenital anomalies and hereditary disturbances.

TABLE 39

New registrations at 0–15 years
Rates per 100,000; 1936–62

	Numbers			Rates per 100,000		
Years*	M.	F.	P.	M.	F.	P.
1936	Not available		236	—	—	2·6
1937	,,	,,	245	—	—	2·8
1938	,,	,,	201	—	—	2·3
1939	,,	,,	140	—	—	1·6
1940	,,	,,	149	—	—	1·7
1941	,,	,,	190	—	—	2·2
1942	,,	,,	228	—	—	2·7
1943	,,	,,	228	—	—	2·7
1944	,,	,,	209	—	—	2·4
1945	,,	,,	220	—	—	2·5
1946	121	84	205	2·7	2·0	2·3
1947	126	114	240	2·7	2·5	2·6
1948	167	127	294	3·3	2·6	3·0
1949	161	143	304	3·1	2·9	3·0
1950	181	161	342	3·5	3·2	3·4
1951	217	183	400	4·1	3·6	3·9
1952	180	155	335	3·4	3·1	3·2
1953	202	140	342	3·8	2·7	3·3
1954	197	146	343	3·7	2·8	3·3
1955	176	115	291	3·3	2·2	2·6
1956	170	102	272	3·1	2·0	2·5
1957	137	93	230	2·5	1·8	2·1
1958	148	104	252	2·6	1·9	2·3
1959	131	98	229	2·3	1·8	2·1
1960	137	78	215	2·4	1·4	1·9
1961	118	86	204	2·2	1·7	1·9
1962	114	106	220	2·1	2·1	2·1

*The years 1936–51 are as at March 31st in the following year; 1952 is adjusted on the data for 9 months April-December; 1953–62 are calendar years.

As for the incidence of individual causes of blindness, for reasons already discussed, the rates per 100,000 for 1948–62 for congenital defects as a whole, shown in Table 27, have no great validity for the years before 1955; for the years 1955–62 the rate has been fairly stationary (excluding the years 1955 and 1961). A much clearer assessment is available in Table 40, which gives the data on the different affections seen in children at Sunshine Homes between 1920 and 1962. Here ophthalmia neonatorum no longer figures in the returns since 1948; the congenitally determined affections have remained high, and it is possible

TABLE 40

Summary table showing the numbers recorded for the major causes of blindness in infants up to 5 years of age admitted to Sunshine Homes for Blind Babies over some periods of years during 1920–62

	1920–29*	1930–39*	1940–47*†	1948–52†	1953–57†‡	1958–62‡
Infections:						
Ophthalmia neonatorum	70	38	16	—	—	—
Other(1)	45	49	33	2	7	11
	— 115	— 87	— 49	— 2	— 7	— 11
Trauma	3	5	13	1	—	2
Congenital anomalies (2)	77	100	135	119	116	129
Retrolental fibroplasia	—	—	—	61	208	77
Other affections:						
Retinoblastoma	7	14	18	23	16	15
Optic atrophy	5	16	34	32	46	67
All other affections (including indefinite aetiology)	7	3	18	20	18	12
	— 19	— 33	— 70	— 75	— 80	— 94
Not fully certified	23	26	2	—	—	—
	237	251	269	258	411	313

(1) Including 'endophthalmitis' and 'pseudoglioma'.
(2) Structural defects, including 'congenital anomalies' not further specified and nystagmus, but excluding glioma, retinitis pigmentosa and optic atrophy.
*Sorsby, A. 1945. For data 1920–43. †Sorsby, A. 1956. For data 1944–54.
‡ Present survey (Table 17) for data 1955–62.

that both optic atrophy and retinoblastoma are on the increase. In contrast, the rise and fall in retrolental fibroplasia is striking. The virtual disappearance of infection in the returns on Sunshine Homes is also brought out in Table 9 which refers to the new registrations during 1955–62; in children under 15 years there was only one case of ophthalmia neonatorum and there were no cases of interstitial keratitis.

Two disturbing possibilities are suggested by the returns on Sunshine Homes. In the first place it is possible that some cases of optic atrophy seen in infants may represent a new form of blindness—perhaps an aspect of multiple defects. Secondly that the increase in retinoblastoma may represent a therapeutically determined increase of a dominant affection: those who would formerly have died now live to become parents of a further generation of affected children.

Blindness at 16–49 *years*

The data in Table 21 show that over the period 1948–62 there has been a steady decline in the rates per 100,000 at 16–39 and at 40–49 years for both men and women. There is no obvious reason for this decline, for, as can be seen from Table 27, the major causes of blindness at these ages—congenital defects, retinitis pigmentosa, and optic atrophy—do not show any marked or consistent decline over these years, though myopic chorioretinal atrophy— the one other major cause—is a possible exception. It is therefore likely that the decline represents mainly a decline in the lesser causes and that the cumulative effect of the elimination of infections may be foremost in this respect.

The alternative to this reading is to assume that social factors are responsible for the decline in the new registrations. This is unlikely for in these age groups a high proportion come to registration though medical sources, and the regularity of the decline suggests an influence rather steadier than social changes. In recent years the decline has slowed down, or has actually halted. It is therefore possible that we are now reaching bed-rock in this age group and that we are entering a period with an essentially stationary rate—repeating the experience reached with children of school age by 1940.

Blindness at 50–69 *years*

It has been seen in Table 21 that for both sexes there has been a steady decline in the rates per 100,000 in new registrations over the period under review for each of the age groups 50–59, 60–64 and 65–69 years. These age groups, coming to registration much more often through lay sources than medical sources, are more prone to changes induced by social factors. These cannot be discounted, but there are valid reasons for accepting the decline as real and the consequence of better services. Thus, as can be seen from Table 27, at 50–69 years the decline in chorioretinal atrophy is probably—as already suggested—the result of better visual aids, at any rate for those aged 50–59 years. Better services may perhaps also account for the decrease seen for iritis and iridocyclitis, and at 60–69 years for glaucoma, whilst the most marked decline recorded for cataract at 60–69 years is clearly the result of administrative action, as the Minister of Health drew the attention of Regional Hospital Boards and teaching hospitals to the long waiting list for cataract surgery in 1954 (Circular RHB53-115). Against these falling rates, there was an increase in the incidence of diabetic retinopathy.

As in the age groups of 16–49 years, most of the decline in incidence occurred in the earlier part of this fifteen year period. It is therefore possible that here, too, a phase of relatively stationary rates is being reached—a conclusion that applies equally to the increase recorded for diabetic retinopathy as to the falling rates for the other affections. It is possible that the diabetic population is now stable and is no longer being inflated numerically by survivors from an earlier period.

Blindness at Senescence

The changing age structure of the general population aged over 70 years—due to the increase in the very aged—would by itself—apart from any social factors—lead to an increase in the rate per 100,000 in this consolidated age group. The actual rates recorded in Table 21 show considerable fluctuations—and these are probably the resultant effect of conflicting influences: those that on the one hand tend to reduce the rate (such as the decline in blindness from cataract) and those that would tend to raise it (such as the increase due to 'senile' macular lesions—an increase itself due to the change in age structure.) These two opposing trends are likely to keep the rate relatively stationary in the foreseeable future.

The foreseeable future

In an earlier study it was suggested that on the projected population of 1973 and its age structure, the number of blind would rise on a purely demographic basis to about 140,000. It is clear now that this figure is unlikely to be reached in the next ten years, for countervailing influences have asserted themselves:

there have been substantial falls in the rate of blindness at almost all age groups. It would therefore seem that the immediate future holds the prospect of a relatively stationary blind population, unless indeed this is disturbed by social factors leading to either a marked increase or a decrease in the numbers seeking registration.

Whether numbers remain stationary or not, the aetiological structure of the blind population is likely to undergo substantial changes. The increase in diabetic retinopathy appears to have come to an end. The decline in the proportion of cataract cases is being offset by an increase—both actual and relative—in the number of those blinded by the senile macular lesions. The further elimination of the residual causes of blindness due to infections is likely to emphasize once more the anomalies of prenatal origin—both the congenital maldevelopmental type and the abiotrophic type. Fundamentally, the same causes as have been operative during the past 15 years will continue to predominate: congenital anomalies, hereditary disturbances, myopic chorioretinal atrophy, glaucoma, diabetic retinopathy, iritis and iridocyclitis, cataract and the senile macular lesions. That the proportions will be different from those seen today may well be significant for the individuals concerned, but does not affect the problems in pathology that will have to be met.

2. CLINICAL ASPECTS

Each of the different clinical entities responsible for blindness has its own problems and possibilities. The following observations are relevant.

1. '*Senile*' *cataract* (22·6 per cent of cases in 1955–60: Table 8).

The marked reduction in the incidence of cataract as a cause of blindness in recent years, shown in Table 27, is a heartening illustration of what can be done by administrative effort in appropriate fields. It is clear that the measures taken so far—examination at certification by a consultant, and greater availability of beds and services demanded by circular RHB (53) 115. — justify further and persistent action on these lines.

2. *Glaucoma* (12·6 per cent of all cases)

All criteria for the diagnosis of glaucoma fall essentially into two groups: evidence of abnormal intraocular pressure—constant or intermittent, spontaneous or induced—and evidence of damage in the visual field—expecially the paracentral field in the early stages. The various screening techniques at present in use for the detection of early glaucoma have as yet given no consistent results as to the validity of these tests and the frequency of glaucoma in the population. Intensive work on these aspects is still needed. In particular, it is necessary to establish a simple test readily carried out in the general population either by general practitioners or by non-medical staff. It is likely that assessment of anomalous intraocular pressure will prove less adequate than simple assessments of the paracentral field by screening devices.

3. '*Senile*' *Macular lesions* (26·9 per cent of all cases).

These affections—the outstanding group in the elderly—do not give blindness in the restricted sense of no perception of light, or of perception of light only.

The newer visual aids may therefore help, and they undoubtedly do help some patients. What is not known is how generally useful these aids are, particularly in the later stages of these affections. An adequate field investigation on these possibilities in this, the largest single cause of blindness, is urgently needed.

4. *Myopic chorioretinal atrophy* (8·4 per cent of all cases)

This affection, which figures heavily in all age groups over 30 years—it was responsible for as much as 18·1 per cent of cases (during 1955–62) at 50–59 years —lends itself to but little amelioration. The place of the newer visual aids in getting some relief also needs to be assessed.

5. *Diabetic retinopathy* (7·1 per cent of all cases)

The age distribution of this affection follows fairly closely that of myopic chorioretinal atrophy. It was responsible for 15.2 per cent of cases at 50–59 years and for 16·7 per cent at 60–69 years. Here the degree of blindness can vary considerably, occasionally giving total loss of sight. The possibilities inherent in visual aids are limited to such cases as show essentially macular lesions.

6. *Optic atrophy* (4·8 per cent of all cases)

In the overall returns this highly complex group shows a distinctly low incidence of the congenital variety which was responsible for 0·6 per cent of cases, the rest being due to acquired causes. The age distribution for both types—and particularly for the congenital type—is heavily weighted towards the younger ages.

Generally optic atrophy produces severe forms of blindness and as systemic and mental associations are frequent, therapeutic possibilities are so limited as to be practically of no relevance.

7. *The congenital and abiotrophic defects* (5·2 per cent of cases).

In this particularly complex group the congenital defects accounted for rather more cases than the abiotrophic disorders (3·2 per cent and 2·0 per cent respectively). The congenital defects (in which optic atrophy, already considered, must be included) are generally of unknown aetiology, though some are clearly genetic in type and others clearly environmental in origin, and yet others, like retrolental fibroplasia an aspect of constitution in its broad sense. This group assumes special significance because of the heavy concentration at childhood, but it remains significant at higher ages, still being responsible for 24·9 per cent of cases at 15–29 years.

In contrast, the abiotrophic defects are clearly hereditary in origin and do not fall heavily on childhood; they contribute a substantial proportion of cases during the active years of life, being responsible for 15·2 per cent of cases at 15–29 years and for 12·8 per cent at 30–49 years.

The range of visual defect in these cases is wide, extending from borderline cases to patients who are totally blind. Therapeutic measures are possible mainly in patients with congenital cataract in eyes otherwise relatively healthy. Visual aids are here, too, a possibility that needs further investigation.

9. *Some lesser causes.*

Iritis and iridocyclitis accounted for 2·3 per cent of all cases and hypertensive and vascular retinopathy was recorded in 3·2 per cent. It is likely that the latter group is an underestimate for some at least of the 'senile' macular lesions are aspects of generalized vascular disorders. Iritis and iridocyclitis more frequently lead to gross visual damage than to blindness, and the relatively low proportion of cases they contribute to the blind population may be taken as something parallel to death rates in an affection with serious sequelae but low mortality. One particularly serious aspect is the frequency of the affection in the younger age groups.

Trauma assumes significant proportions only in the younger age groups and mainly in men. It was responsible for 6·1 per cent of all cases in males at 15–29 years and for 3·1 per cent at 30–49 years. A clear distinction between industrial and other forms of trauma is not always possible from the data in the blind certificates. As trauma is an outstanding cause of monocular blindness—as distinct from blindness affecting both eyes—and as monocular blindness is not registrable, it is obvious that a full assessment of the overall significance of trauma, and in particular of industrial trauma, can be reached only by appropriate field studies. These are all the more urgent as preventive measures are probably readily available in some forms of trauma, and particularly in the industrial trauma seen in young men.

It is a truism that each solution brings its own problems. The latter end of the previous century eliminated the residue of blindness due to such mass infections as smallpox and trachoma, bringing into relief the more individual infective causes of blindness such as ophthalmia neonatorum and congenital syphilis. These, and other infections, were being brought under control by public health measures in the first third of the present century, and the therapeutic revolution brought about by the sulphonamides and antibiotics in the 'thirties and 'forties helped to reduce them to statistical insignificance. The consequences of these developments were not only the bolder relief into which the genetic and constitutional causes of blindness were thrown, but also new disturbances arising from the changed conditions. Diabetic retinopathy in survivors of longstanding diabetes, retrolental fibroplasia in infants who previously would have succumbed to their marked prematurity—such developments represent the price paid for conquests that are not quite complete. Likewise, the prolongation of life, without corresponding prolongation of health, is loaded with intractable problems. The advances of therapeutics—as distinct from the eradication of ancient evils—also contribute to the constant emergence of new difficulties and problems, as is well shown by optic atrophy in survivors from tuberculous meningitis; the glaring example of thalidomide has fortunately had few repercussions in ophthalmology, but the blindness from chloroquine retinopathy emphasizes the ever-present dangers in new explorations. Today more than ever the prevention of blindness calls not only for intensive attention to specialized problems, but also for equally intensive scanning of the broader issues.

As for the immediate future, apart from the possibility of a substantial reduction in blindness from cataract and perhaps from glaucoma, no real advances are feasible without a massive increase in our knowledge. The research problems thus presented again dictate a variety of specialized and specific procedures. The congenital defects call for an understanding of the pathology of the embryo and

the study of the pathology of the embryo may have to develop as a specialty in its own right. With the advances in genetic biochemistry, the abiotrophies are assuming a less forbidding aspect than in the past. Considerable basic work will have to be done in medical ophthalmology units before any impression is made on the mass of systemic disease that underlies such affections as optic atrophy, diabetic retinopathy, uveitis, the hypertensive and vascular disorders, and possibly also the 'senile' macular lesions. There are no facile hopes and no easy roads. To face the problems of tomorrow, ophthalmology must at the very least expand beyond its surgical frontiers into the medical wards and the research laboratories.

3. ADMINISTRATIVE PROBLEMS

Ophthalmology has several unique features. It ranks with general medicine and general surgery as a major specialty in the number of new out-patients it serves: some 600–630 thousand for ophthalmology, a similar number for general medicine, and some 900 thousand for general surgery. In addition to the hospital out-patient services, ophthalmology and the practice of optics carry a very large supplementary service which deals with some 5½ million patients a year. It ranks, however, amongst the minor specialties in the number of beds it requires. Whilst in recent years general medicine and general surgery have each had some 34,000 beds, ophthalmology has had around 4,400, or only about twice the number for dermatology or thoracic surgery.

Obviously, provision for out-patient services has to be on a very large scale, and it is clear that in the foreseeable future ophthalmology is likely to remain with a wide network of out-patient services. As for beds during 1948–62, their number has risen by roughly a quarter: in 1951 the number stood at 4,070 (the low figure of 3,524 is recorded for 1949–50) and this has risen in a discontinuous way to 4,460 in 1962. These beds have however been used to a greater extent for the average duration of stay fell from 13·3 days in 1953 to 11·7 days in 1962 and the number of patients discharged from the eye beds rose from 67,630 in 1949 steadily to 101,884 in 1962. An increase in the number of beds of the order of 25 per cent was therefore accompanied by an increase of some 50 per cent of patients treated and it is likely that even this could be bettered. Parallel to this greater exploitation of existing in-patient facilities, there has been a marked expansion in the number of out-patient clinics. This stood at 5,316 in 1949 and had risen to 7,645 in 1962. Over these years the number of ophthalmic consultants has risen but slightly—from 295 to 310.

In its first 15 years the National Health Service has therefore provided what is in effect a 50 per cent increase in both in-patient work and out-patient facilities. During these years the incidence of blindness from cataract has declined by some 25 per cent or more, and lesser advances have been recorded for many of the other causes of blindness. Though no direct cause and effect between these two developments can be established, it would be strange if they were indeed unrelated. To assume some relationship is reasonable enough on general grounds, and the assumption is supported by the fact that the most marked advance—the reduction of blindness from cataract—came with administrative action planned to that effect. But the burden of blindness still lies heavily on considerably more than the 100,000 registered blind people in England and Wales. A yet heavier burden in a population with increased longevity and increasing numbers has probably been averted, in part at any rate, by the administrative changes during 1948–62.

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APPENDIX

Table A. Causes of blindness: major aetiological groups 1955–62.

Table B. Causes of blindness by site and clinical entity 1955–62.

Table C. List of headings with their code numbers used for the classification of causes:

(i) Classification by type and site of affection

(ii) Classification by aetiology or pathology.

TABLE A

Causes of blindness: major aetiological groupings

1955–62

(1955–60: all ages; 1961: 0–60 years; 1962: 0–65 years)

Both eyes blinded by the same cause

	1955				1956				1957				1958				1959				1960				1955–60						1961		1962			
	M.		F.		M.		F.		M.		F.		M		F.		M.		F.		M.		F.		M.		F.		P. No.	%	M.		F.		M.		F.	
Infectious Diseases																																				
Syphilis (acquired) ...	18		4		10		7		21		3		5		3		5		4		5		4		64		25		89		7		3		2		1	
Tuberculosis ...	13		7		9		2		2		6		6		3		8		4		7		5		45		27		72		7		4		5		—	
Trachoma	2		2		2		4		—		3		—		4		4		3		2		1		10		17		27		—		—		—		—	
All other	6	39	13	26	14	35	13	26	6	29	10	22	5	16	13	23	9	26	9	20	2	16	9	19	42	161	67	136	109	297	0·5	5	19	2	9	9	16	1	4	6
	—		—		—		—		—		—		—		—		—		—		—		—		—		—		—			—		—		—		—	
Trauma																																				
Occupational ...	16		—		18		1		12		—		10		1		9		1		8		—		73		3		76		6		—		8		1	
Military	13		2		8		—		8		—		10		1		12		1		2		1		53		5		58		2		—		3		—	
All other	17	46	6	8	16	42	6	7	14	34	8	8	8	28	4	6	16	37	8	10	11	21	5	6	82	208	37	45	119	253	0·4	7	15	6	6	14	25	3	4
	—		—		—		—		—		—		—		—		—		—		—		—		—		—		—			—		—		—		—	
Poisoning																																				
Therapeutic ...	20		23		27		21		8		11		5		9		8		12		6		6		74		82		156			6		7		3		10
All other	5	25	—	23	5	32	1	22	9	17	1	12	3	8	—	9	2	10	1	13	14	20	1	7	38	112	4	86	42	198	0·3	—	6	—	7	1	4	—	10
	—		—		—		—		—		—		—		—		—		—		—		—		—		—		—			—		—		—		—	
Tumours																																				
Ocular	2		2		7		3		2		2		2		2		5		4		4		1		22		14		36			3		4		5		7	
Intracranial ...	33		24		35		44		39		27		37		32		39		40		25		34		208		201		409			35		28		31		27	
All other	2	37	6	32	2	44	6	53	2	43	7	36	9	48	7	41	4	48	8	52	1	30	7	42	20	250	41	256	61	506	0·9	4	42	1	33	5	41	1	35
	—		—		—		—		—		—		—		—		—		—		—		—		—		—		—			—		—		—		—	
Systemic Diseases not elsewhere classified																																				
Diabetes	129		494		169		557		157		533		150		559		176		518		182		576		963		3,237		4,200			55		92		91		150	
Vascular disease ...	169		186		170		239		196		289		139		231		158		197		150		231		982		1,373		2,355			11		14		35		26	
Neurological disorders	17		13		29		24		25		16		16		16		25		20		23		31		135		120		255			23		17		24		19	
All other	28	343	36	729	28	396	31	851	30	408	39	877	57	362	52	858	63	422	74	809	67	422	70	908	273	2,353	302	5,032	575	7,385	12·7	16	105	12	135	24	174	21	216
	—		—		—		—		—		—		—		—		—		—		—		—		—		—		—			—		—		—		—	
Pre-natal influences																																				
Genetic-established ...	39		64		77		64		75		53		69		53		89		56		79		57		428		347		775			58		31		54		41	
Genetic-presumed	69		45		56		62		53		54		53		47		67		40		65		47		363		295		658			39		41		49		55	
Transmitted maternal infection; ...																																				
Congenital syphilis	17		44		20		43		18		32		22		29		16		27		16		30		109		205		314			13		15		10		23	
Rubella	—		4		—		1		—		4		1		1		1		1		2		3		4		14		18			4		4		3		3	
Toxoplasmosis ...	—		—		—		—		—		1		—		—		—		1		—		—		—		2		2			—		—		1		—	
Congenital: aetiology uncertain, including multiple defects (syndromes of unknown origin). ...	124	249	86	243	159	312	137	307	121	267	97	241	116	261	87	217	131	304	84	209	127	289	86	223	778	1,682	577	1,440	1,355	3,122	5·4	96	210	72	163	114	231	81	203
	—		—		—		—		—		—		—		—		—		—		—		—		—		—		—			—		—		—		—	
Aetology Undetermined																																				
'Senile'	1,508		3,016		1,767		3,278		1,664		3,189		1,499		3,077		1,570		3,268		1,704		3,304		9,712		19,132		28,844			—		—		8		17	
'Myopic degeneration'	247		500		303		639		328		586		270		530		279		561		290		603		1,717		3,419		5,136			73		86		114		143	
Undetermined ...	851	2,606	1,090	4,606	938	3,008	1,259	5,176	905	2,897	1,216	4,991	860	2,629	1,179	4,786	914	2,763	1,173	5,002	891	2,885	1,255	5,162	5,359	16,788	7,172	29,723	12,531	46,511	79·8	162	235	164	250	257	379	271	431
	—		—		—		—		—		—		—		—		—		—		—		—		—		—		—			—		—		—		—	
Total		3,345		5,667		3,869		6,442		3,695		6,187		3,352		5,940		3,610		6,115		3,683		6,367		21,554		36,718		58,272	100·0		632		603		870		905

TABLE B

Causes of blindness by site and clinical entity

1955—62

(1955—60: all ages; 1961: 0—60 years; 1962: 0—65 years)

Both eyes blinded by the same cause

	1955		1956		1957		1958		1959		1960		1955–1960						1961		1962	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.		F.		P.		M.	F.	M.	F.
EYEBALL IN GENERAL ...	640	770	717	877	638	849	619	834	703	821	654	891		3,971		5,042		9,013	90	79	149	124
Congenital defects:																						
Nystagmus	3	2	12	9	8	2	11	9	11	1	12	4	57		27		84		4	2	6	6
Albinism	1	4	1	5	5	3	1	2	12	7	4	3	24		24		48		2	6	1	3
Anophthalmos	3	2	1	1	1	—	1	—	1	—	—	—	7		3		10		1	—	1	1
Buphthalmos	10	3	11	4	8	2	11	3	8	3	9	4	57		19		76		3	—	4	6
Microphthalmia	10	8	5	5	6	7	10	8	9	2	3	6	43		36		79		8	5	8	6
Aniridia	1	4	4	4	3	3	2	4	3	3	4	2	17		20		37		2	2	3	2
Colobomata, multiple ...	3	9	1	1	4	6	5	5	5	3	3	7	21		31		52		6	3	2	1
Multiple and ill-defined anomalies	15	14	30	34	19	17	11	13	22	15	23	15	120	346	108	268	228	614	8	7	20	15
Acquired affections:																						
Glaucoma	515	636	558	729	510	710	499	709	531	677	521	758		3,134		4,219		7,353	28	29	65	63
Trauma:																						
Occupational	14	—	14	1	7	—	8	1	7	1	5	—	55		3		58		4	—	6	—
Military	2	—	3	—	2	—	3	1	4	1	1	1	15		3		18		1	—	2	—
Others	9	4	7	4	7	2	4	3	8	3	7	3	42	112	19	25	61	137	4	3	7	1
Tumours of adnexa	—	4	1	—	2	2	2	4	1	2	—	1		6		13		19	—	—	—	—
Diabetes	3	12	4	9	3	24	—	1	5	16	—	4		15		66		81	2	5	—	—
Vascular	2	1	4	1	1	—	1	1	—	—	1	—		9		3		12	—	—	—	—
Pemphigus	—	—	1	—	1	—	—	—	—	—	—	—		2		—		2	—	—	—	—
Other affections, specified ...	4	7	2	4	1	1	1	1	10	6	2	6		20		25		45	3	1	1	2
Other affections, not specified	45	60	58	66	50	70	49	69	66	81	59	77		327		423		750	14	16	23	18

TABLE B—*continued*

	1955		1956		1957		1958		1959		1960		1955–1960			1961		1962	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	P.	M.	F.	M.	F.
CONJUNCTIVA	7	13	6	13	3	6	6	11	3	11	1	8	26	62	88	3	4	2	4
Ophthalmia neonatorum ...	3	5	6	11	3	6	4	8	3	6	1	7	20	43	63	—	2	2	2
Pemphigus	2	5	—	2	—	—	2	2	—	4	—	—	4	13	17	1	—	—	1
Kerato-conjunctivitis sicca ...	—	1	—	—	—	—	—	—	—	1	—	—	—	2	2	—	—	—	—
Other affections, specified ...	1	1	—	—	—	—	—	1	—	—	—	—	1	2	3	—	1	—	1
Other affections, not specified	1	1	—	—	—	—	—	—	—	—	—	1	1	2	3	2	1	—	—
CORNEA	74	131	90	164	84	167	80	137	67	141	74	151	469	891	1,360	26	30	26	45
Dystrophies	2	4	—	1	1	5	—	2	1	1	2	—	6	13	19	—	—	—	2
Keratoconus	1	5	—	8	1	3	3	3	—	2	2	5	7	26	33	1	1	—	—
Interstitial keratitis	15	37	18	40	13	30	15	28	11	26	13	27	85	188	273	8	12	10	22
Mooren's ulcer	1	2	1	3	3	2	4	1	4	1	2	1	15	10	25	—	2	—	—
Trachoma	2	2	2	4	—	3	—	4	3	1	2	1	9	15	24	—	—	—	—
Trauma:																			
Occupational	—	—	—	—	—	—	1	—	—	—	1	—	2	—	2	1	—	1	—
Military	6	—	5	—	5	—	5	—	6	—	6	—	33	—	33	—	—	—	—
Other	—	1	—	1	1	1	1	—	—	2	—	—	2 37	5 5	7 42	—	—	1	—
Skin conditions:																			
Acne rosacea	2	5	1	5	2	8	3	2	4	10	2	9	14	39	53	—	—	—	2
Pemphigus	—	—	1	—	—	1	—	1	—	1	5	2	6	5	11	—	—	—	—
Other skin affections ...	—	—	1	—	3	3	—	—	—	1	—	1	4 24	5 49	9 73	—	—	1	—
Kerato-conjunctivitis sicca ...	—	—	—	—	—	—	—	—	—	1	—	5	—	6	6	—	—	—	—
Other affections, specified ...	3	3	1	3	—	2	—	1	—	—	1	2	5	1	16	—	—	—	—
Other affections, not specified	42	72	60	99	55	109	48	95	38	95	38	98	281	568	849	16	15	13	19

TABLE B—*continued*

	1955		1956		1957		1958		1959		1960		1955–1960			1961		1962	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	P.	M.	F.	M.	F.
LENS	731	1,593	842	1,761	740	1,620	658	1,463	699	1,583	695	1,534	4,365	9,554	13,919	60	51	115	99
Cataract:																			
'Senile'	673	1,539	769	1,695	679	1,560	590	1,420	619	1,520	621	1,480	3,951	9,214	13,165	—	—	8	16
General disease (Diabetes and others)	2	—	1	1	1	—	1	1	—	1	—	—	5	3	8	2	1	2	—
Pre-natal influences:																			
Genetic	5	6	6	6	5	3	7	4	2	8	4	6	29	33	62	2	5	10	5
Rubella	—	4	—	—	—	3	1	1	—	1	1	3	2	12	14	3	3	2	3
Congenital	46	30	49	46	40	36	46	30	52	40	56	36	289	218	507	26	24	46	27
Congenital, part of a syndrome	—	2	8	5	3	3	1	1	—	—	—	—	12 332	11 274	23 606	—	—	—	—
Trauma	—	1	—	—	1	—	—	—	—	—	—	—	1	1	2	—	—	—	—
Undetermined	4	8	4	3	7	11	8	5	21	10	7	5	51 4,340	42 9,534	93 13,874	23	15	42	48
Dislocated lens:																			
Congenital	1	2	4	3	4	3	3	1	2	2	3	2	17	13	30	3	1	4	—
Genetic...	—	1	—	2	—	1	1	—	3	1	3	2	7	7	14	1	2	1	—
Other	—	—	1	—	—	—	—	—	—	—	—	—	1 25	— 20	1 45	—	—	—	—
UVEAL TRACT	332	659	404	860	423	775	344	670	349	718	362	754	2,214	4,436	6,650	90	123	145	189
Congenital anomalies... ...	1	1	1	1	1	1	—	—	1	—	—	—	4	3	7	—	—	—	—
Dystrophies (choroideremia) choroidal sclerosis and other hereditary affections)	3	4	—	—	—	—	—	—	2	—	—	—	5	4	9	—	—	2	1
Iritis and iridocyclitis (including associated choroiditis):																			
Rheumatoid arthritis ...	3	7	2	8	3	7	2	9	5	7	1	5	16	43	59	3	1	2	6
Ankylosing spondylitis ...	2	1	5	1	—	2	1	—	2	1	1	—	11	5	16	—	—	3	—
Diabetes	1	2	—	1	—	—	—	1	—	—	1	1	2	5	7	—	—	—	—
Tuberculosis	—	1	—	—	—	1	—	—	—	—	—	—	—	2	2	—	—	—	—
Sarcoidosis	—	1	—	1	—	—	—	—	3	—	—	—	3	2	5	—	—	—	—
Congenital syphilis... ...	—	—	—	—	—	1	—	—	—	—	—	—	—	1	1	—	—	—	—
Other affections, specified	1	1	1	2	1	—	2	2	1	1	—	1	6	7	13	—	2	1	1
Not specified	71	144	67	159	78	149	66	113	56	129	65	123	403 441	817 882	1,220 1,323	14	32	32	37
Choroiditis:																			
Congenital syphilis ...	2	5	—	2	3	1	5	—	4	2	3	2	17	12	29	2	2	—	1
Acquired syphilis	1	1	1	3	1	—	—	2	—	1	—	—	3	7	10	—	1	—	1
Toxoplasmosis	—	—	—	—	—	—	—	—	—	1	—	—	—	1	1	—	—	—	—
Other general disease ...	—	—	10	5	2	—	—	—	—	—	1	1	13 33	6 26	19 59	—	—	2	—
Not specified	34	25	38	60	34	40	15	30	16	23	18	30	155	208	363	6	7	1	7
Myopic chorioretinal atrophy	213	466	279	617	300	573	253	513	259	552	271	591	1,575	3,312	4,887	65	78	102	135
Other affections specified ...	—	—	—	—	—	—	—	—	—	1	1	—	1	1	2	—	—	—	—

TABLE B—*continued*

	1955		1956		1957		1958		1959		1960		1955–1960			1961		1962	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	P.	M.	F.	M.	F.
RETINA	1,266	2,290	1,493	2,503	1,483	2,537	1,359	2,575	1,471	2,579	1,602	2,771	8,674	15,255	23,929	207	208	261	329
Retrolental fibroplasia ...	20	23	27	20	8	11	5	9	8	9	5	6	73	78	151	7	5	3	7
Retinal aplasia	3	1	2	1	4	3	2	5	2	1	—	1	13	12	25	8	5	3	4
Retinoblastoma	2	2	7	3	2	2	2	2	5	4	3	1	21	14	35	3	4	5	6
Retinal dystrophies:																			
Retinitis pigmentosa ...	77	65	103	86	84	67	70	70	86	59	85	62	505	409	914	65	41	60	54
Allied affections					8	10	12	—	21	8	22	18	63	36	99	11	8	12	5
Macular lesions:																			
'Senile' macular lesions ...	835	1,477	1,004	1,588	984	1,629	909	1,657	950	1,748	1,083	1,824	5,765	9,923	15,688	12	13	20	25
Dystrophies	9	9	4	11	8	8	11	7	9	6	4	6	45	47	92	4	2	6	13
In general disease	2	2	—	—	2	5	1	2	3	2	2	4	10	15	25	—	—	1	1
Unspecified	4	21	—	—	13	22	14	12	18	22	21	23	70	100	170	—	—	—	—
Detached retina:																			
Myopia	34	34	24	22	28	13	17	17	19	9	19	12	141	107	248	8	8	12	8
Trauma	2	—	1	—	—	—	2	—	1	—	2	—	8	—	8	1	—	1	—
Genetic	1	1	1	—	—	—	1	—	1	—	—	—	4	1	5	—	—	—	—
Congenital	—	—	—	—	1	—	—	1	1	—	—	—	2	1	3	—	—	—	—
Undetermined	23	25	36	28	38	11	46	38	34	33	50	28	227	163	390	19	7	16	23
General diseases:																			
Anaemia and haemorrhage	—	—	1	—	—	1	1	—	—	2	1	3	3	6	9	—	—	—	—
Nephritis	3	3	1	—	2	2	3	1	2	2	—	2	11	10	21	—	1	1	—
Hypertensive and Vascular	116	131	112	191	144	237	110	193	128	165	120	208	730	1,125	1,855	11	13	23	21
Diabetes	125	480	165	546	154	509	150	557	171	501	181	571	946	3,164	4,110	53	86	89	146
Diseases of pregnancy ...	—	—	—	—	—	1	—	—	—	—	—	1	—	2	2	—	—	—	—
Other	1	—	—	—	1	—	1	2	—	—	2	—	5	2	7	—	1	3	2
Drug induced retinopathies ...	—	—	—	—	1	—	—	—	1	—	1	—	3	—	3	—	2	1	1
Trauma:																			
Military	—	1	—	—	—	—	—	—	1	—	—	—	1	1	2	—	—	—	—
Other	1	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—
Other affections	8	15	5	7	1	6	2	2	10	8	1	1	27	39	66	5	12	5	13

TABLE B—*continued*

	1955		1956		1957		1958		1959		1960		1955–1960						1961		1962	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.		F.		P.		M.	F.	M.	F.
OPTIC NERVE	257	180	268	229	284	197	237	216	267	222	233	219	1,546		1,263		2,809		142	102	151	109
Optic atrophy:																						
Infections:																						
Acquired syphilis ...	17	3	9	4	20	3	5	1	5	3	5	4	61		18		79		6	2	2	—
Tuberculosis	6	5	5	1	2	3	1	2	2	4	1	2	17		17		34		2	2	1	—
Meningococcal meningitis	1	2	2	—	2	3	1	2	—	2	—	—	6		9		15		—	—	2	1
Other	—	—	4	—	—	—	—	—	1	—	1	—	6	90	—	44	6	134	—	—	3	—
Trauma:																						
Occupational	1	—	3	—	4	—	—	—	2	—	1	—	11		—		11		1	—	1	1
Military	3	—	—	—	2	—	1	—	1	—	1	—	8		—		8		1	—	—	—
Other	6	1	9	1	6	5	3	1	6	3	3	2	33	52	13	13	46	65	2	3	6	2
Poisonings:																						
Therapeutic	—	—	—	1	—	—	—	—	—	3	1	—	1		4		5		1		—	2
Tobacco amblyopia ...	3	—	4	1	4	1	1	—	—	—	2	—	14	15	2	6	16	21	—	—	—	—
Tumours: ...																						
Intra cranial	33	23	35	43	39	25	37	32	39	39	24	34	207		196		403		34	28	30	27
Adnexa	1	1	1	2	—	1	5	—	—	2	—	3	7		9		16		—	—	—	—
Metastatic	1	1	—	3	—	3	—	1	1	1	1	1	3		10		13		1	—	1	—
Site undetermined ...	—	—	—	1	—	1	—	1	1	2	—	2	1	218	7	222	8	440	2	1	4	—
General diseases:																						
Anaemia and haemorrhage	2	—	1	2	2	—	1	2	2	1	1	1		9		6		15	—	1	1	3
Vascular	28	27	24	27	27	35	25	37	30	32	29	23		163		181		344	—	1	8	4
Multiple sclerosis ...	17	11	19	11	17	14	8	11	11	14	15	21		87		82		169	20	13	18	17
Other neurological disorders	—	—	6	6	7	2	8	4	9	5	5	6		35		23		58	2	3	3	2
Other	4	7	1	2	2	—	4	2	1	3	3	—		15		14		29	3	1	4	5
Pre-natal influences:																						
Genetic	5	4	6	4	9	2	9	2	9	2	11	3	49		17		66		8	4	4	5
Congenital syphilis ...	1	—	2	1	2	—	2	2	1	—	—	1	8		4		12		2	—	—	—
'Congenital'	19	6	18	9	18	11	11	6	25	14	21	12	112		58		170					
'Congenital' part of a syndrome	12	10	20	12	10	7	8	9	—	—	—	—	50	219	38	117	88	336	28	19	24	18
Undetermined	94	79	99	98	111	79	106	101	121	92	107	104	——	638		553	——	1,191	29	24	39	21
Other affections	3	—	—	—	—	2	1	—	—	—	1	—		5		2		7	—	—	—	1

TABLE B—*continued*

	1955		1956		1957		1958		1959		1960		1955–1960			1961		1962	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	P.	M.	F.	M.	F.
VITREOUS	8	1	6	4	6	6	8	3	6	—	6	4	40	18	58	5	1	6	2
Haemorrhage	8	1	6	4	6	6	8	3	6	—	6	4	40	18	58	4	1	4	—
Other	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	2	2
GLOBE NORMAL	30	29	39	29	33	28	40	31	45	38	55	34	242	189	431	9	5	15	4
Presumed vascular disorders of the path ways	22	29	32	26	29	24	34	26	41	35	49	33	207	173	380	6	4	14	3
Presumed intracranial injury:																			
Occupational	—	—	—	—	—	—	—	—	—	—	1	—	1	—	1	—	—	—	—
Military	2	—	—	—	—	—	—	—	1	—	—	—	3	—	3	—	—	—	—
Other	—	—	—	—	—	—	—	—	—	—	3	—	3 7	— —	3 7	—	—	—	—
Presumed intracranial lesion from other specified causes	—	—	—	—	—	1	1	1	—	—	—	—	1	2	3	1	—	1	1
Presumed mental defect ...	—	—	5	3	—	—	—	1	1	2	—	—	6	6	12	—	—	—	—
Tobacco amblyopia ...	1	—	1	—	2	—	2	—	1	1	—	—	7	1	8	—	—	—	—
Undetermined	5	—	1	—	2	3	3	3	1	—	2	1	14	7	21	2	1	—	—
ILL-DEFINED LESIONS ...	—	1	4	2	1	2	1	—	—	2	1	1	7	8	15	—	—	—	—
Total...	3,345	5,667	3,869	6,442	3,695	6,187	3,352	5,940	3,610	6,115	3,683	6,367	21,554	36,718	58,272	632	603	870	905

TABLE C

List of headings with their code numbers used for the classification of causes:

(i) Classification by type and site of affection.

(ii) Classification by aetiology or pathology.

(i) CLASSIFICATION BY TYPE AND SITE OF AFFECTION

1. Eyeball in General

110 Glaucoma (excluding infantile)
120 Nystagmus
130 Panophthalmitis and acute endophthalmitis

14. Congenital anomalies

141 Albinism
142 Anophthalmos (excluding surgical)
143 Megalophthalmos (buphthalmos, infantile glaucoma, hydrophthalmos)
144 Microphthalmos
145 Aniridia
146 Coloboma, any part (excluding surgical)
147 Multiple structural anomalies
148 Other structural anomalies, specified
149 Structural anomaly, not specified

15. Acquired Degenerative changes:

151 Disorganized eyeball (atrophic globe, phthisis bulbi)
158 Other general degenerative changes, specified
159 General degenerative changes, not specified
170 Exophthalmos
180 Other general affection of eyeball, specified (including trauma)
190 General affection of eyeball, not specified

2. Conjunctiva

200 Ophthalmia neonatorum
210 Purulent ophthalmia of adults
220 Other affection of conjunctiva, specified
230 Affection of conjunctiva, not specified

3. Cornea and Sclera

31. Keratitis:

311 Interstitial
312 Phylctenular
313 Ulcerative
314 Sclerosing (including scleromalacia perforans)
315 Hypopyon
316 Keratoconjunctivitis (including Keratoconjunctivitis sicca)
319 Type not specified
320 Corneal dystrophy
330 Megalocornea
340 Mooren's ulcer

35. Vascularization:

351 Vascularization with ulceration
352 Vascularization without ulceration
359 Vascularization, not specified
370 Keratoconus
380 Other affection of cornea, specified
390 Affection of cornea, not specified (including nebulae and scars)
391 Scleritis

4. Crystalline Lens

410 Cataract
420 Dislocated lens
480 Other affection of lens, specified
490 Affection of lens, not specified

5. Uveal Tract

510 Iritis
520 Iridocyclitis and uveitis
530 Kerato-iritis
550 Choroiditis
560 Chorioretinitis

58. Other affection of iris, ciliary body or choroid, specified:

581 Choroideremia
582 Gyrate atrophy
583 Other allied affections—of choroid
589 Other affection of iris, or ciliary body or choroid, specified
590 Affection of iris, ciliary body or choroid, not specified

6. Retina

610 Retinopathy
620 Retinal haemorrhage
630 Retrolental fibroplasia
631 Retinal aplasia
640 Detached retina
650 Retinitis pigmentosa
651 Other retinal dystrophies

66. Macular degeneration:

661 Macular dystrophy
662 Other macular degeneration
670 Other retinal degeneration
680 Other affection of retina, specified (including tobacco amblyopia)
690 Affection of retina, not specified

7. Optic Nerve, Optic Pathway and Cortical Visual Centres

710 Optic nerve atrophy
720 Optic neuritis (papillitis)
730 Papilloedema (choked disc)
740 Neuroretinitis
750 Retrobulbar and intra-cranial lesions
780 Other affection of optic nerve, specified
790 Affection of optic nerve, not specified

8. Vitreous

810 Vitreous haemorrhage
880 Other affection of vitreous, specified
890 Affection of vitreous, not specified

9. Site not Specified

920 Globe normal
930 High refractive error
980 Other ill-defined lesion, specified
990 Inadequate data

(*ii*) CLASSIFICATION BY AETIOLOGY OR PATHOLOGY

INFECTIOUS DISEASES (excluding transmitted maternal infections)

110	Diptheria
120	Gonorrhoea
130	Measles
140	Meningococcal meningitis
160	Scarlet fever
170	Septicaemia
180	Smallpox
181	Herpes affection
182	Other virus disease
190	Syphilis
200	Trachoma
210	Tuberculosis (including tuberculous meningitis)
211	Sarcoidosis
220	Typhoid fever
230	Rubella
240	Onchocerciasis
250	Toxoplasmosis
260	Brucellosis
270	Leprosy
280	Other infectious disease, specified (e.g. meningitis, unspecified; intracranial abscess, unspecified; sinus thrombosis)
290	Infectious disease, not specified

TRAUMA

30	Birth processes
31	Occupational hazard
32	Household activity
33	Play or sport
34	Traffic or travel
35	Military operations
36	Sympathetic ophthalmia
38	Other activity, specified
39	Activity not specified

Supplementry Classification:

·0	Chemical causing burn
·1	Radiation
·11	Infrared
·12	Gamma
·13	Neutron
·14	Type not specified
·2	Other object or substance causing burn
·3	Firearm using explosive
·4	Airgun, slingshot, etc.,
·5	Fireworks (any type)
·6	Other explosive
·7	Sharp or pointed object
·8	Blow or fall
·9	Foreign body in eye
·X	Other agent or source, specified
·V	Agent or source not specified

POISONINGS

51	Occupational activity
52	Non-occupational activity
53	Military operations
54	Therapeutic agents
59	Activity not specified

·1	Methyl alcohol
·2	Dinitrophenol
·3	Lead
·4	Quinine
·8	Other poison, specified
·9	Kind of poison, not specified

TUMOURS

610	Ocular
620	Adnexa
630	Intra-cranial
640	Metastatic
680	Site undeterminable
690	Site not specified

DISEASES NOT ELSEWHERE CLASSIFIED

710 Anaemia and other blood disease
720 Diabetes mellitus
730 Nephritis and other kidney disease
740 Vascular disease (including arteriosclerosis but excluding cerebro-vascular lesions)
741 Mitral stenosis and heart disease
742 Cerebro-vascular lesions (including subarachnoid haemorrhage and carotid syndrome)
750 Multiple sclerosis
751 Other neurological disorders
752 Functional and hysterical disorders
753 Myopathies
760 Diseases of pregnancy
770 Nutritional deficiency
771 Endocrine disturbances

78. Other specified diseases:
781 Acne rosacea
782 Pemphigus
783 Other skin disease specified (including pseudo-xanthoma elasticum)
784 Skin diseases, not specified
785 Rheumatoid arthritis
786 Ankylosing spondylitis
787 Other specified inflammatory affection (e.g., Paget's disease of bone; scleromalacia perforans)
788 Inflammatory affection, not specified
789 Other diseases not elsewhere classified, specified (e.g., Eales' disease, Behcet's syndrome)
790 General diseases not specified

PRE-NATAL INFLUENCES

810 Genetic origin, established (positive family history)
811 Part of a syndrome
820 Genetic origin, presumed (no record of family history)
821 Part of a syndrome

84. Transmitted maternal infections
841 Syphilis
842 Rubella
843 Toxoplasmosis
848 Other, specified
849 Other, not specified
850 Prematurity
890 Pre-natal influence, type not specified (i.e., 'congenital')
891 Pre-natal influence type not specified, with associated general defects, i.e., part of a syndrome (including mental deficiency)

AETIOLOGY UNDETERMINED OR NOT SPECIFIED

910 Undetermined
920 So-called senile type
930 Myopic type
940 Amblyopia ex anopsia
950 Refractive error
960 Normal
990 Not specified

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